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Evaluation of the Expanded Off Line EBT System in Ohio

Volume 1:

Statewide Adoption of Smart Cards for Food Stamps in Ohio

Abt Associates Inc.

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Executive Summary

Between July 1996 and February 2000, the Ohio Department of Jobs and Family Services (ODJFS) designed, developed, and implemented an off-line electronic benefits transfer (EBT) system for issuing Food Stamp Program (FSP) benefits throughout the state as a replacement for paper benefit issuance. Previously, the U.S. Department of Agriculture's Food and Nutrition Service (FNS) supported a pilot project in Dayton, Ohio that established the technical feasibility of off-line EBT for FSP benefit issuance as an alternative to on-line EBT issuance systems. A related demonstration in Wyoming successfully tested an off-line EBT system serving both the FSP and the Special Supplemental Nutrition Program for Women, Infants and Children (WIC). Both the Ohio and Wyoming pilot projects, however, were small in scale, and both incurred higher administrative costs than the paper coupon issuance systems they replaced, according to previous FNS evaluations.

By October 1999, the Ohio Direction Card system was operating in all 88 counties in Ohio. The implementation process was completed in February 2000, when the system served all 255,000 FSP recipient households. This report describes how the Direction Card system works; the process undertaken by ODJFS and its EBT vendor to design, develop, and test the system; the implementation process and experiences; and the cost of system design, development, and implementation. Volume 2 of this report compares the ongoing administrative costs of system operations and system levels of benefit loss and diversion with those of on-line EBT systems and the Dayton pilot. Volume 2 also describes the patterns of system usage after implementation and provides an overall feasibility assessment of the Ohio Direction Card system. Information in these reports was collected between July 1996 and December 2001.

Features of Off-line and On-line EBT Systems

The most distinguishing feature of the Direction Card system is that it is an off-line EBT system. Nearly all EBT systems operating in the country today are on-line systems that work very much like bank debit card systems. That is, recipients are issued magnetic stripe EBT cards that are used at point-of-sale (POS) terminals in authorized food stores to access their FSP benefits. At the checkout counter, the recipient enters his or her personal identification number (PIN) in the terminal to authorize EBT payment of the food stamp purchase. The terminal immediately uses a telecommunications network to connect to the EBT system's host computer, which maintains a special EBT account for the recipient. If the PIN is verified and benefits remaining in the account are sufficient to cover the requested purchase, the transaction is authorized and the recipient's remaining balance is reduced by the amount of the sale. The retailer is reimbursed at the end of the day during system "settlement," which leads to an electronic transfer of funds from an EBT account maintained at the U.S. Treasury to the retailer's depository institution.

In contrast, an off-line EBT system maintains current information about a recipient's remaining balance within the card itself. Both Ohio and Wyoming use "smart cards," plastic cards the size of a credit or debit card, but which have a microprocessor and memory chip embedded within the card. These elements allow the card to store information and to perform a range of mathematical calculations and logic checks. This functionality allows all EBT transaction processing to be conducted

within and between the POS terminal and EBT card, including PIN verification and checking remaining balance information. Thus, there is no need to contact the system's host computer immediately in order to complete a transaction, thereby speeding up the checkout process and eliminating system downtime due to telecommunications problems. Each POS terminal "settles" daily with the host computer by transmitting information about the day's EBT purchases over a telecommunications network. During system settlement, the host computer totals the day's credits and debits, and then initiates reimbursement to the retailer as in an on-line system.

Another important distinction between on-line and off-line EBT systems is that, because off-line systems use cards with greater data storage capacity than magnetic stripe cards, the potential exists to expand off-line systems to include a wider range of applications than on-line systems. The Wyoming off-line EBT system serves the WIC Program as well as the FSP. Wyoming and other states in the Western Governor's Assocation have tested the use of smart cards to carry health data. In October 2000, the Ohio Department of Health began conducting a pilot test using the Direction Card system for the WIC Program in the Dayton, Ohio area.

Selection of EBT Vendor

In February 1994, the ODJFS issued a Request for Proposals (RFP) for the development, implementation, and operation of a statewide off-line EBT system. Responses to the RFP were received in July 1994, and Ohio awarded a contract to Citicorp Electronic Financial Services, Inc. (Citicorp EFS) in September 1994. Work on system design and development was delayed, however, by a legal conflict that arose after another bidder, National City Processing Company (NPC), contended in court that the contract award process had been flawed. The procurement problems were resolved in April 1996 when Citicorp EFS added Stored Value Systems (SVS), then a subsidiary of NPC, as one of its subcontractors for the EBT project. SVS (now part of Comdata Corporation) is responsible for the design and development of the Direction Card system, transaction processing at the system's host computer, retailer settlement, and operation of the EBT customer service center. The other major subcontractor, CACI International, Inc. (CACI), is responsible for installing and maintaining EBT equipment at retail and county office locations, for training retailer and county staffs in how to use the system, and for supplying cards and other materials to retailers and county offices.

The problems with the procurement process delayed the start of the design and development phase, but the resolution vastly simplified the design and development process by allowing Citicorp EFS to build its EBT system directly on the existing PayEase EBT system that NPC had developed for the Dayton pilot. As a result, the vendors were able to proceed with system development activities concurrently with the system design effort.

System Design

Although its basic design is quite similar to the predecessor PayEase EBT system, the Direction Card system does contain a number of enhancements. The most significant is that the system takes advantage of a new generation of smart cards and POS terminals to improve system security. Using a smart card with more processing capacity than the one used in the PayEase system, the system's designers have moved critical security operations from the POS terminal to the smart card itself.

This change was needed because ODJFS required that retailers in the Direction Card system be allowed to integrate EBT processing into their existing POS systems, if desired. (To date, however, all retailers have chosen to use State-supplied off-line terminals rather than pay to integrate off-line EBT with their POS systems.) The Direction Card terminals also can accept new software downloads via the telecommunications network from the system's host computer, rather than requiring a technician to visit the store to update the software. This greatly facilitates the introduction of system upgrades.

In the PayEase system, retailers received a "negative file" during daily settlement. The file contained records of all EBT cards reported as lost, stolen or damaged and prevented these cards from being accepted at the POS terminal. Due to the larger size of the statewide Direction Card system, smaller stores (i.e., those with only one POS terminal) now receive a regional negative file. (Multi-lane stores are equipped with a personal computer with sufficient memory and processing capacity to handle the large statewide negative file.) With regionalization, the negative file sent to a particular single-lane store includes only those cards reported as lost, stolen or damaged by recipients in the county or counties that make up the retailer's region. If recipients from outside the retailer's region attempt to use their EBT cards at the store, the transactions must be authorized by a phone call to EBT Customer Service. These "out-of-region" transactions are very infrequent.

Another added feature of the Direction Card system is that, in those counties serving at least 10,000 FSP recipients, county workers can use a special administrative terminal for on-line access to the EBT host to perform certain EBT functions (e.g., review transaction history for a recipient; obtain authorization to replace a lost, stolen or damaged card). In the PayEase system, county staff had to call Customer Service to perform these functions.

System Development and Testing

Even though much of the software required for the Direction Card system had already been developed for the PayEase system, the changes in system design and equipment noted above required additional development effort. With a new smart card taking on more of the processing functions, the card's internal operations had to be programmed. Similarly, software programs had to be developed for the system's new POS terminals.

The host computer's software was changed to accommodate some of the new security features of the Direction Card system. One major change is that store refunds and other "value-adding" transactions are no longer written directly to the card. Instead, in order to protect the system from potential fraud and error, all value-adding transactions are sent to the host computer for verification and later downloading to the recipient's card. Other major changes are the introduction of a unique encryption key for each card, the addition of an encryption key for each State or other entity issuing cards, and the incorporation of the industry-standard method of adding a Message Authentication Code (MAC) to each POS transaction when it is created and to each value-changing transaction staged at the host computer.

Other system development activities included preparation of training materials and procedures for county staff, retailers, and recipients; preparation of user manuals for county staff and retailers;

development of standard retailer EBT participation agreements; and development of procedures for installing EBT equipment at retail and county office locations.

System development efforts took place in the summer and fall of 1996. FNS, the system vendor, and ODJFS then prepared for a three-day test of the system in December. Due to the extensive testing and operational experience with the predecessor PayEase system, the test of the Direction Card system focused on those aspects of the system which had been changed. Only minor problems were noted during the test, and FNS formally approved the system on December 17, 1996.

System Implementation

The statewide implementation of the Direction Card system began in January 1997, when the Citicorp EFS team converted the existing accounts of Montgomery County recipients from the PayEase pilot system to the Direction Card system. The process ended over three years later, in February 2000, when the last recipients were converted from food stamp coupon issuance to using the Direction Card. Between March 1997 and September 1999, the Citicorp EFS team equipped and trained the remaining 87 County Departments of Jobs and Family Services (CDJFS) and over 5000 retailers. The CDJFS, in turn, provided cards and training to over 255,000 recipients. The three-person ODJFS project team oversaw this entire process and provided on-site consultation, training and trouble-shooting assistance to the CDJFS. ODJFS and the Citicorp EFS team established the overall schedule, but each CDJFS had its own schedule for recipient conversion within this framework.

Implementing the Direction Card system throughout Ohio was a large and complex endeavor. The state, vendor and county staff accomplished this goal through careful planning, effective management and hard work. ODJFS and the Citicorp EFS team developed and followed a detailed, comprehensive implementation plan. This plan provided for the phased, coordinated implementation of the system on a region-by-region basis. Within this framework, each county agency developed its own implementation plan for notifying and converting recipients, in keeping with Ohio's county-administered approach to the FSP. In planning for implementation, the Citicorp EFS team had to devote particular care to the required effort and logistics of equipping and training the large and dispersed retailer population. The Citicorp EFS team prepared to equip and train every FSP-authorized retailer, whereas EBT contractors in on-line EBT states only equip and train the small retailers who do not already have POS systems that can be adapted to accept EBT cards.

The major retailer conversion activities were marketing the EBT system, establishing agreements with retailers, installing POS equipment, and training store personnel. CACI conducted these activities under the supervision of Citicorp EFS. CACI devoted more than the expected amount of effort to this process, in part because of the challenge of getting retailers to cooperate and perform their part of the process. Other challenges included scheduling installations and training, planning and completing installations in multi-lane stores, and getting sufficient numbers of store staff trained.

Retailers generally adapted quickly to the EBT system, and the level of service for retailer equipment troubleshooting and repair was quite good during implementation, according to Citicorp EFS and ODJFS. During the early implementation period, the Citicorp EFS team found that the retailers requested POS equipment service more frequently than expected. The sources of these calls included

user errors, impacts from environmental conditions in the stores, communications network access problems, flaws in the POS software, and occasional front-end processing problems at the EBT host computer. The Citicorp EFS team resolved most of the software flaws and processing problems by the end of 1998, and they resolved the communications network problems by the spring of 1999. The incidence of user errors declined as store personnel became more used to the EBT system, but there was an ongoing need for training because of the specialized nature of the system and the turnover among store personnel.

To prepare for their roles in EBT system implementation, the county agencies established implementation schedules, selected and organized conversion staff, prepared their sites for equipment installation, and established internal procedures. The county offices had to be prepared for a more substantial role in recipient conversion than in many states, where contractors have done much of this work, either by mail or through locally-based mass training sessions. In each county, CACI installed the card management systems (CMS) and other equipment, and trained the EBT conversion staff. ODJFS provided additional training for these staff on the functions of the state's CRIS-E computer system used for conversion and ongoing recipient service.

In preparing for implementation, the greatest challenge for the county agencies was finding ways to work around the constraints of available staff and space. Staffing in many counties had been reduced because of declining caseloads, and available staff sometimes needed extra training because they lacked the desired base of experience. Staffing constraints and competing priorities led some counties to choose more gradual conversion schedules. A few counties renovated space to handle the expected volume of recipients, while limited space forced others to extend their conversion schedules. The training for EBT conversion staff was generally seen as thorough and effective, but delays in implementation and staff turnover sometimes led to staff being less prepared for their duties than was needed.

To convert food stamp recipients to the Direction Card system, the county staff created schedules, sent out notices, checked recipients in upon arrival, updated critical CRIS-E information, trained recipients through group instruction and hands-on practice, assisted recipients in selecting issuance sites and PINs, and issued cards. The conversion process took from one month to nine months, depending on the size of the county, the schedule set by the county agency, and other factors. Each recipient typically spent one to two hours to complete the process. ODJFS and CACI provided on-site support to each county at the start of the recipient conversion process.

In most counties, the greatest challenge of recipient conversion was getting recipients to attend their scheduled conversion sessions. Every county established a training schedule to expedite the process, but attendance at the initially scheduled session was not mandatory. For this and other reasons, "no-show" rates were often 50 percent or more, and counties had to devote major efforts to scheduling and tracking recipient conversion. Most counties made conversion mandatory after two notices requesting voluntary attendance, so that recipients could only obtain their food stamp benefits if they received their EBT cards and training. Some counties gave recipients more notices before mandatory conversion, because county managers were concerned about handling large numbers of recipients needing to be converted around the benefit issuance period and possible repercussions if large numbers were unable to use their benefits.

The EBT equipment and special CRIS-E screens used by county EBT staff generally worked well, but the county staff encountered a variety of problems as they used these systems in the conversion process. Some early users encountered difficulties with the CMS because of flaws in the CMS software, or because of errors due to confusion or inexperience with personal computers. Many county workers found the EBT equipment complicated to use at first, but they generally reached a level of proficiency within four to six weeks. The Citicorp EFS team made a number of enhancements to the CMS software to correct flaws, prevent user errors, and improve performance. The CRIS-E system was sometimes slow and occasionally unavailable, affecting the pace of conversion. The EBT system design and the structure of the recipient conversion process required many counties to adapt their established patterns of controlling workers' access to CRIS-E. This process of adaptation was often challenging and sometimes slowed the conversion process. Unlike EBT staff in some on-line states, the county EBT staff in Ohio were not dependent on real-time on-line communications to the EBT host to issue individual cards and perform other customer service functions.

The SVS customer service hotline, available toll-free 24 hours a day, served as a vital resource for county staff, retailers and recipients as they learned to use the Direction Card system. The volume of calls to the hotline was greater than expected, and the peak load during the recurring issuance cycle was particularly challenging to handle. This load, combined with the challenges of staffing a growing operation, led to a substantial degree of dissatisfaction on the part of county agencies and retailers during the middle portion of the implementation period. SVS responded and achieved a satisfactory level of service by reorganizing the customer service staff and enhancing training and management.

For recipients, the most common reason for seeking help was uncertainty about their EBT account balances. One factor was the unfamiliarity of recipients with EBT or similar payment systems. Another factor was that the timing of benefit availability varied, because of the number of steps to make benefits available and the possibility that these steps–particularly retailer settlement–could be delayed.

During the implementation phase, recipients tended to use customer service operators, not the automated response unit (ARU), to get their balances. Some of this pattern was due to reluctance or preference on the part of recipients. To increase ARU utilization, the Citicorp EFS team improved the pre-recorded user instructions. With the approval of ODJFS, the Citicorp EFS team also eliminated the requirement to enter the date of birth for a balance inquiry, which had been problematic because of errors in entering the birth date on CRIS-E or the ARU.

Problems with lost, stolen, damaged or locked cards were less common, but the rate of replacement was nevertheless a concern. As a result, ODJFS worked with the Citicorp EFS team on a process for charging card replacement fees, as permitted by FNS regulations, but this process was not implemented during the evaluation.

Finally, ODJFS and the Citicorp EFS team addressed a variety of technical issues with the Direction Card system and made improvements during the three-year implementation period. The transition to the Year 2000 was an event that had raised considerable concern because of deficiencies in past programming practices. Through careful testing and planning, the project team completed this transition without incident. The Citicorp EFS team and ODJFS identified and resolved a number of

problems with the benefit issuance and reconciliation processes, which are more complex in off-line EBT systems than in on-line systems. The interactions of the host, POS terminal and card add steps to the issuance process and increase the complexity of accounting for both issued and expired benefits. Improvements were made to the handling of issuances staged for loading, the reporting of issuances loaded by recipients, and the transfer of balances to replacement cards. The Citicorp EFS team also updated the POS software to fix problems, to accommodate a new generation of smart cards, and to improve system performance. ODJFS technical staff addressed issues raised by counties shifting to newer technologies for connecting to CRIS-E and by discrepancies between different mechanisms used to report and reconcile issuances and settlement of funds.

System Design, Development, and Implementation Costs

The estimated cost of the resources used from July 1996 through April 1997 for the design and development of the statewide Direction Card system in Ohio was $2.5 million. (All cost figures presented herein are indexed to the year 2000. The cost data were obtained from interviews and documentation provided by participating organizations.) The Citicorp EFS team's estimated costs during this phase were $2.4 million. This figure represents resources expended by the Citicorp EFS team, not the $1.3 million that ODJFS paid to Citicorp EFS for specific design and development phase deliverables. ODJFS incurred about $110,000 in staff labor and other internal costs (not including the payments to Citicorp EFS). Labor costs represented 79 percent of the total cost of design and development, which entailed 22 person-years of effort.

The cost for implementation activities occurring from January 1997 through February 2000 was $17.0 million, not including system operations during this period. The estimated resource costs of implementation for the Citicorp EFS team were $8.7 million; their level of effort was 87 person-years. The largest component of the vendor cost was labor and overhead for retailer installation and training, which entailed $3.9 million out of a total of $6.3 million in labor and overhead. At the county level, the estimated implementation cost was $7.7 million, and the level of effort was 183 person-years. (County costs are estimated from interviews conducted in four large and six small counties.) ODJFS incurred $0.6 million in costs and spent 7 person-years of labor on implementation.

Thus, the total resource cost to expand the off-line EBT system statewide in Ohio was about $19.6 million, or $74 per food stamp household. The total vendor resource cost was $11.0 million, and the vendor team spent 108 person-years on the process. The combined cost for ODJFS and the counties was $8.5 million, and their level of effort was 192 person-years. Because of the reliance on the CDJFS to convert all recipients and the autonomy of the CDJFS, more resources were devoted to local EBT planning than would typically be used in a more centralized, state-administered setting.

There was substantial variation on county implementation costs within the group of ten counties where data were collected. As a group, the smaller counties had an average implementation cost of $32 per case, whereas the estimated statewide average was $29 per case. The most typical large counties had an average implementation cost of $23 per case, but among all large counties the range was from $10 per case to $42 per case. One of the chief factors affecting the variation in county costs was that larger counties spread their planning and management costs over more cases, thus realizing economies of scale. Counties that took longer to convert to EBT tended to have higher

costs, and the structure and level of staffing for EBT conversion was also a factor influencing the county cost.

The design and development costs of $2.5 million for the Direction Card system were slightly greater than the $2.2 million (adjusted for inflation) in resource costs to design and develop the PayEase system for the Dayton, Ohio off-line EBT pilot project. The Direction Card costs were more focused on documentation and preparations for implementation, whereas the PayEase costs were more focused on software design, development and testing. At the county level, the average cost of $29 per case for Direction Card implementation was a fraction of the $63 per case cost for PayEase implementation in Dayton. The Direction Card costs were so much lower because of several factors: the considerable level of experience gained through the pilot, the economies of scale in planning and management, the use of county (not leased) facilities, and the greater reliance on county staff (rather than more expensive contractor staff).

Conclusions

In sum, the statewide expansion of the off-line EBT system for the FSP in Ohio was a large, lengthy, complex, and remarkably successful effort. Many challenges were encountered, and some stake-holders experienced temporary hardships while problems were resolved, but the process was gener-ally quite smooth. The Direction Card system reliably supports FSP benefit issuance and redemp-tion, while eliminating the error-prone and burdensome processes that the coupon system entailed for recipients, retailers, and administering agencies. Unlike on-line EBT systems, the Direction Card system allows retailers and recipients to make transactions without delays due to slowdowns or outages in telecommunications networks, host processors, and third-party processors. In addition, the Direction Card system provides a platform for a future multi-program EBT system, such as the WIC/FSP system that began pilot operations in October 2000.

Chapter 1
Introduction

In 1994, the Ohio Department of Jobs and Family Services (ODJFS) obtained approval from the Food and Nutrition Service (FNS) of the U.S. Department of Agriculture to expand a pilot electronic benefits transfer (EBT) system operating in Dayton, Ohio. The pilot system was the first EBT system to employ off-line technology to deliver program benefits in the Food Stamp Program (FSP). As described later in this chapter, "off-line" EBT systems differ from "on-line" systems in several important ways. ODJFS was the first large state agency to undertake statewide implementation of an off-line EBT system.[1]

In July 1996, ODJFS and its team of contractors, led by Citicorp Electronic Financial Services (Citicorp EFS), began to design and develop the statewide off-line EBT system, which ODJFS calls the Direction Card[2] system. By October 1999, as a result of the efforts of ODJFS, the Citicorp EFS team, and county agencies, the Direction Card system was operating in all 88 counties in Ohio. The implementation process was completed in February 2000, when the system served all 255,000 FSP recipient households.

1.1   Evaluation Objectives

FNS awarded a contract to Abt Associates Inc. in September 1994 to evaluate the expanded EBT system.[3] The evaluation has the following four objectives:

1)   Describe any additional development, the implementation, and operation of the off-line EBT system as it expands beyond the pilot site.

2)   Quantify and compare the administrative costs of the expanded off-line EBT system with those of the pilot EBT demonstration in Ohio, with an off-line EBT demonstration in Wyoming, and with other on-line EBT systems.

3)   Quantify and compare losses and diversions of the expanded off-line EBT system with those of the pilot demonstration and with other on-line EBT systems.

4)   Assess the conditions under which a statewide, off-line EBT system is most likely to achieve cost-neutrality and cost effectiveness.

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1   FNS authorized the project under demonstration authority, because regulations at the time did not permit off-line EBT systems. In 1996, the Personal Responsibility and Work Opportunity Reconciliation Act (PRWORA) allowed States to choose off-line EBT systems.

2   Direction Card is a registered service mark of ODJFS.

3   Contract #53-3198-4-022, Evaluation of the Ohio Expanded Food Stamp Program Off-Line Electronic Benefits Transfer System.

The evaluation's final report consists of two volumes. This volume addresses the first objective above by describing the new system and the process that ODJFS and its EBT vendors followed to design, develop and implement the Direction Card system. The report also presents estimates of the costs incurred to design, develop and implement the new system. The report incorporates and updates information presented in the evaluation's Interim Report.[4] The second volume of the Final Report addresses the evaluation's remaining objectives.

1.2   On-Line and Off-Line EBT Systems

FNS has been fostering the development and use of on-line EBT systems since the early 1980s. An on-line EBT system works very much like debit card (also called bank card or ATM card) systems offered by financial institutions. The food stamp recipient is issued a plastic card that has a magnetic stripe affixed to the back of the card. This stripe contains a unique EBT account number related to the card (which is known as the primary account number, or PAN) and a card expiration date. The EBT account linked to the card and recipient is established by the EBT system processor, which stores this information on a central ("host") computer system. All FSP issuance amounts are posted to this electronic account. Each recipient also obtains a personal identification number (PIN), which is maintained at EBT host in encrypted form and used as proof of authorization to use the card.

When the recipient uses the EBT card to buy food at a program-authorized retailer, the card's magnetic stripe must be read by an EBT-capable terminal at the point of sale (known as a POS terminal), and the recipient must enter the PIN to verify the recipient's identify. The requested food stamp purchase amount is then entered into the EBT terminal (either by key entry or by data transfer from the cash register), and a message is sent immediately to the EBT system's host computer over a regular or dedicated telephone line. The host computer verifies that the correct PIN has been entered, that the card is valid, and that the recipient's EBT account has enough funds to cover the requested purchase amount. The host computer also verifies that the store is authorized to redeem food stamp benefits. After passing these tests, the purchase transaction is authorized, and the amount is debited from the recipient's account balance and credited to the retailer's account. Once a day, the processor conducts system "settlement," when all retailer credits are totaled and electronic funds transfers are initiated to move funds overnight from the EBT vendor's account at a financial institution to the retailer's financial institution. The next day, the retailer's financial institution credits the retailer's account for the prior day's transactions.[5]

An off-line EBT system differs from an on-line system in several ways. First, current information about the recipient's balance of food stamp benefits is maintained in the EBT card itself rather than at the system's host computer. Because the card's data storage requirements in an off-line system are

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4   P. Elwood et al., "Evaluation of the Expanded Off-Line EBT System in Ohio: Moving to a Statewide EBT System Using Smart Cards for Food Stamps", Project Officer: J. Genser. U.S. Department of Agriculture, Food and Nutrition Service, Office of Analysis, Nutrition and Evaluation, Alexandria, VA, 1999.

5   This description reflects the simplest form of the on-line EBT transaction and settlement process, when the EBT processor connects directly with the store terminals. Some retailers use third-party processors or internal systems to connect with the EBT processor. For this and other reasons, there may be more steps in the settlement process, and payment to the retailer's account may occur two or more days after the transaction date.

greater than can be provided with a magnetic stripe card, a different card technology is needed. The technology used for FSP EBT is the "smart card," which has a microprocessor and memory chip embedded in the plastic. When the recipient uses the smart card to buy groceries, the EBT card is inserted into the EBT terminal and the PIN is entered. Software within the terminal and card perform a PIN verification. When the PIN is verified, the store clerk enters the requested food stamp purchase amount into the EBT terminal.[6] This information is passed to the smart card, which compares the requested purchase amount to the balance information stored in the card. If the remaining balance is sufficient to cover the requested purchase, the transaction is authorized. The remaining balance on the card is reduced by the amount of the purchase, and a record of the transaction is stored on the card. No phone call to the host computer is needed to authorize the purchase transaction. Instead, the EBT terminal (or a small computer linked to all the EBT terminals in a store) dials into the system host computer once a day to transmit information about the day's EBT transactions. The host computer uses this information to initiate system settlement so the retailer can be reimbursed for the day's transactions. The information is also used to maintain a "shadow" EBT balance for each recipient. This shadow balance, which does not reflect purchases made during the day until retailers upload their daily files to the host computer, is used to restore benefits to a recipient if his or her EBT card becomes lost, stolen or damaged.[7]

1.3   Previous Off-Line EBT Demonstrations

The expansion of the off-line EBT system in Ohio took place in the context of two prior off-line FSP EBT demonstrations for FNS. The first is the EBT pilot demonstration in Dayton, Ohio. In 1990, FNS awarded a contract to National City Processing Company (NPC) to design, develop, implement, and operate a demonstration off-line EBT system in Dayton. The purpose of the demonstration was to test the technical and financial feasibility of using off-line EBT technology for delivering food stamp benefits. Seventeen months later, in February 1992, food stamp recipients began using the system. By June 1992, the off-line EBT system, called "PayEase," was fully operational and delivering food stamp benefits to over 10,000 recipient households.

An evaluation of the Dayton EBT pilot concluded that the PayEase system was technically viable and that, compared to paper benefit issuance, it reduced recipient, food retailer, and financial institution costs to participate in the FSP. The PayEase system also reduced levels of benefit loss and diversion, again compared to the paper issuance system. The administrative cost of the PayEase system, however, was nearly triple the cost of the paper issuance system it replaced. Nevertheless, the evaluation concluded that a potential for significant cost reductions existed, especially in a statewide system where economies of scale could be realized.[8]

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6   As discussed later in this report, a retailer could attach a smart card reader to the cash register and program the register to perform the POS terminal functions. To date, no retailer in Ohio has chosen this integrated solution.

7   Further details of transaction processing are provided in Chapter 2.

8   G. Glickman et al., "The Impacts of the Off-line EBT Demonstration on the Food Stamp Program, Volume 1—Impact on Administrative Costs", Project Officer: M. Andrews. U.S. Department of Agriculture, Food and Nutrition Service, Office of Analysis, Nutrition and Evaluation, Alexandria, VA, 1994.

In 1991, the State of Wyoming conducted a small pilot test of a smart card-based, off-line EBT system delivering benefits for the Special Supplemental Food Program for Women, Infants and Children (WIC). In 1993, with support and funding from FNS, Wyoming initiated a larger EBT demonstration involving both the WIC and FSP programs. Wyoming selected NPC to design and develop the "PayWest" system. The demonstration system, which was implemented in the spring of 1995, served all WIC and FSP clients in Natrona County (Casper), and also served all WIC clients in six other Wyoming counties.

In 1999, Wyoming expanded the FSP portion of the PayWest System statewide and began conversion to a new FSP/WIC system, which was implemented statewide by December 2001. The PayWest system provided a platform for the Western Governors Association's Health Passport Project (HPP), which tested a variety of smart card applications for the WIC, Maternal and Child Health, Medicaid, and other programs. The HPP operated in pilot sites in Wyoming, North Dakota and Nevada from 1999 to 2001. The WIC portion of the HPP continued to operate in the Nevada sites after the formal HPP pilot, pending a decision on the future of the project.

There is a fundamental difference between the WIC EBT application first tested in the PayWest system and the FSP EBT applications used in the PayEase, PayWest and Direction Card systems. (As discussed later, the Direction Card system also has a WIC application operating on a pilot basis.) Although FSP benefits are dollar-denominated and can be spent on any food stamp-eligible food items in program-authorized stores, WIC benefits are a prescription for a specific list and quantity of food items. Thus, unlike the FSP EBT applications, the WIC EBT applications have to compare the specific items being purchased against the WIC participant's food prescription and against a table of authorized WIC foods. Information about the food prescription is loaded and stored on the WIC EBT smart card; the table of authorized foods is stored in the POS system.

The evaluation of the Wyoming EBT demonstration concluded that the PayWest system was technically feasible and that its reliability matched that of early EBT demonstrations of on-line systems. It offered more customer services than the paper system it replaced, especially for WIC clients, and program participants almost universally viewed the EBT system as a more convenient, secure, and dignified way to deliver benefits than either WIC checks or food stamp coupons. It was, however, considerably more expensive to operate than the paper delivery systems it replaced. The evaluation concluded that several factors, including operating the system on a larger scale, could dramatically reduce system operating costs.[9]

1.4   The Ohio Direction Card System

Based on its experience with the PayEase system in Dayton, the ODJFS became "convinced of the efficiency and cost effectiveness of off-line technology, as well as its acceptability to recipients, retailers, and financial institutions."[10] ODJFS therefore decided that it wanted to implement a

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9   W. Hamilton et al., "Costs and Impacts of the Wyoming Smartcard EBT System", Project Officer: J. Kresge. U.S. Department of Agriculture, Food and Nutrition Service, Office of Analysis, Nutrition and Evaluation, Alexandria, VA, 1997.

10   Ohio Department of Human Services, "Food Stamp Electronic Benefits Transfer System RFP," 1994, p. 3.

statewide EBT system using off-line technology. The expanded system initially would issue food stamp benefits, although there was also interest in adding other programs to the system, including WIC and cash benefit programs.

In February 1994, ODJFS issued a Request for Proposals (RFP) for the development, implementation and operation of a statewide, off-line EBT system. ODJFS awarded the EBT contract to Citicorp EFS on September 20, 1995, and contract work began October 30. A suit seeking an injunction against the award was filed soon thereafter, however, and a lengthy period of legal activities and negotiations ensued. Citicorp EFS ultimately submitted a revised proposal with a new set of subcontractors. A subsidiary of NPC, Stored Value Systems Inc. (SVS), joined the Citicorp EFS team as the subcontractor to develop the system and operate the data and customer service centers. The revised proposal was acceptable to all parties, and contract work resumed in July 1996. Seven months later, on January 1, 1997, recipients in Dayton converted to the new Direction Card system. Exhibit 1-1 presents key dates for the process of designing, developing, and implementing the statewide EBT system in Ohio. The statewide expansion of the system began in March 1997 and ended in February 2000, when nearly 255,000 households used the system.

1.5 Report Organization

This report has several objectives. The first is to describe how the new Direction Card system works. To this end, Chapter 2 describes the Direction Card system and identifies those areas in which the new system differs in design and operation from the pilot PayEase system. The report also documents the process by which the Direction Card system was designed and developed, which is the subject of Chapter 3. Chapter 4 documents the process of implementing the system, both in Montgomery County where the pilot system operated, and in the rest of Ohio, where EBT is a totally new method for delivering FSP benefits. Chapter 5 presents the costs of designing, developing, and implementing the Direction Card system, including state, county, and vendor costs. Appendix A provides information on the cost data sources and analysis methods. A glossary of acronyms and technical terms is included as Appendix B.

Exhibit 1-1

Key Events in Design, Development, and Implementation of the Direction Card System

September 1990	FNS awards NPC a contract to design, develop, implement, and operate a demonstration of off-line EBT system in Dayton, Ohio.
February 1992	First recipients converted to pilot PayEase EBT system.
July 1993	ODJFS submits to FNS a Planning Advanced Planning Document (PAPD) for statewide rollout of off-line EBT.
February 1994	ODJFS issues RFP for the development, implementation, and operation of the Ohio Electronic Benefit Transfer Food Stamp benefits distribution system.
July 1994	Citicorp EFS submits its proposal to the RFP.
September 1995	ODJFS signs EBT contract with Citicorp EFS.
October 1995	NPC files suit against ODJFS and Citicorp EFS. Initial kick-off meeting for the Ohio EBT project.
January 1996	Judge rules in favor of NPC, directs Ohio to re-solicit cost proposals from Citicorp EFS and NPC.
April 1996	Citicorp EFS submits revised Final Proposal with SVS (a subsidiary of NPC) as a subcontractor.
June 1996	Ohio approves revised proposal.
July 1996	Second kick-off meeting for the Ohio EBT project.
October 1996	Citicorp EFS submits final version of Detailed System Design Document.
December 1996	Citicorp EFS team begins three-day acceptance test of EBT system. FNS approves Direction Card system.
January 1997	Direction Card system begins operation in Montgomery County pilot area.
March 1997	Retailer contacts and installation for expansion begin in Montgomery County.
August 1997	Recipient conversion for expansion begins in Montgomery County.
December 1998	Over 100,000 FSP households using Direction Cards.
September 1999	All county offices equipped, trained, and issuing Direction Cards.
February 2000	All recipients converted.

Chapter 2
System Description and Operation

2.1   Introduction

The Direction Card program represents the first initiative to convert a large, urbanized state to use smart cards for off-line EBT. This program builds on the state's EBT pilot project, known as the PayEase system, that was used to deliver FSP benefits to a segment of the food stamp population in Montgomery County.[1] In February 2000, the Direction Card system provided access to food stamp benefits for over 255,000 households across all 88 counties in Ohio.

2.2   Organizations

The design, development, implementation, and operation of the Direction Card system for the delivery of food stamp benefits involved the coordination of several public and private organizations. Their principal roles and responsibilities are outlined below.

The Ohio Department of Jobs and Family Services

The ODJFS administers the federally funded FSP, serving all households that meet the eligibility criteria based on income and household size.[2] The ODJFS administers the contract with the EBT service provider—Citicorp Electronic Financial Services, Inc. (Citicorp EFS)—and assumes all contract management functions. In this capacity it served to assure that the system being developed satisfied the requirements outlined in its RFP and contract. Its data center operates and maintains the state's integrated public assistance system (known as the Client Registry Information System – Enhanced, or CRIS-E) that interfaces with the EBT service provider's computer system on a daily and monthly basis to effect the transfer of issuance data and other information necessary to operate the EBT system.

County Departments of Jobs and Family Services

In Ohio, the 88 County Departments of Jobs and Family Services (CDJFS) assume direct responsibility for FSP administration. Five different operational areas within each CDJFS are affected by EBT. The five areas are:

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1   The PayEase EBT system became operational in March 1992 and delivered food stamp benefits to a segment of the food stamp population in Montgomery County. The demonstration was split into five distinct phases, lasting over 30 months. Design of the system began in September 1990, and development was complete by December 1991. The system began operations in March 1992, with all recipients in the demonstration area converted by June 1992. This project ran through December 31, 1996 before converting to the Direction Card system.

2   ODJFS was formed in July 2000 by the merger of the Ohio Department of Human Services and the Ohio Bureau of Employment Services.

- Caseworkers, who determine recipient eligibility during certifications and recertifications. During the certification process, caseworkers gather data from recipients to help establish a record on the EBT system and authorize issuance of an initial Direction Card.

- Fiscal Control Office (FCO) workers, who perform all terminal-based transactions that update the Direction Card or the EBT host computer, including card issuance and card replacement.

- Assistance Control Office (ACO) workers, who provide EBT training to recipients and assist them with account balance problems. The ACO workers also provide authorization to the FCO workers to replace cards and perform any administrative action that changes the balance on a recipient's card.

- Cashiers, who handle the process of converting EBT balances to food stamp coupons when recipients move to an area not served by the Direction Card system.

- The Accounting Office, which is responsible for the security and accountability of the inventory of smart cards maintained in the office. In some counties this may be handled by the FCO supervisor.

The Citicorp EFS Team

The Citicorp EFS team consists of Citicorp EFS and its subcontractors, Stored Value Systems, Inc. (SVS) and CACI International Inc. (CACI).[3] Citicorp EFS, as the prime contractor, serves as the project manager and is responsible for providing the state with EBT services in accordance with its contract. SVS is primarily responsible for the design, development and integration of all software and hardware for system operations, including the EBT host system, retailer POS terminals, and the card management system (CMS) in each CDJFS office. SVS is also responsible for the actual operation of the EBT host system, customer service for both retailers and recipients, retailer settlement services, all communications facilities, and the generation of all fiscal and management reports. CACI is primarily responsible for all contacts with retailers, including solicitation of agreements, site surveys, equipment installation and servicing, distribution of supplies and brochures, and training. CACI is also responsible for contact with each CDJFS office, including installation and servicing of CMS and POS equipment, initial training of workers in each operational area, and distributing cards and other supplies to the CDJFS.

The Food and Nutrition Service, USDA

FNS is the federal agency charged with the administration of the FSP nationally. Through its local field offices, FNS authorizes retailers to participate in the FSP and, when necessary, withdraws such authorization. FNS provides store authorization numbers and other retailer information to the

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3   SVS was created as a subsidiary of NPC at about the same time that Citicorp EFS added NPC to its EBT project team. Comdata Corporation, a subsidiary of Ceridian Corporation, purchased SVS in May 2000. CACI joined the Citicorp EFS team when it acquired Century Technologies (CENTECH) in April 2000.

Citicorp EFS team for entry into the EBT system. The Midwest Regional office of FNS monitors EBT operations in Ohio.

2.3 Overview of the Direction Card System

The Direction Card system comprises six main components that interact to provide recipients with their food stamp benefits, including the provision of the monthly FSP allotment, the capture and processing of EBT transactions, and the reimbursement of participating retailers. These six components are:

- recipients' smart cards
- the system processor's host computer
- the state's recipient information system (CRIS-E)
- the card management system (CMS) at county offices
- retailer point-of-sale (POS) equipment; and
- telecommunications facilities.

Together, these six components support a number of different types of EBT transactions. Some of these transactions involve credits or debits to retailer and recipient accounts, whereas others provide information without any change in value to retailer or recipient accounts. To facilitate later discussion of system design and operations, these transaction types are defined in Exhibit 2-1.[4] In the discussion that follows, "staged" transactions are those that are not applied immediately to a recipient's Direction Card, including credits and manually authorized sales (debits). When a staged transaction is initiated at a retailer's location, information is passed to the host computer during the retailer's settlement. The host computer then processes the transaction and stages it for downloading during the next settlement cycle to the recipient's selected retail locations and CDJFS. The host computer also stages benefit issuances originated by CRIS-E and downloads them to retail locations and CDJFS offices for loading onto recipients' cards. The recipient's next transaction at one of these locations causes the POS terminal to load the credit or debit onto the card.

The six main components of the Direction Card are described below.

Smart Cards

Each FSP recipient household in the state has a smart card that is used to access benefits at authorized retailers.[5] This card, named the Direction Card, contains an embedded microprocessor chip that interacts with retailer POS systems when recipients shop. The card maintains the household's

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4   The descriptions for these transactions are adopted from the Direction Card reference manual supplied by Citicorp EFS to retailers participating in the system.

5   The card being used for the statewide rollout of EBT is the PayFlex purse card manufactured by Schlumberger, Inc. (An electronic purse is an application in a card where value can be stored.) The PayFlex card used for the statewide FSP-only application has 1 kilobyte of data storage and allows for enhanced security functionality. The FSP/WIC pilot project uses a 4 kilobyte PayFlex card, which can have multiple purses.

Exhibit 2-1

Direction Card Recipient Transaction Types

Food stamp purchase, which is used when a food stamp client wants to use his or her food stamp EBT benefits to pay for program-eligible food items.

Food stamp purchase reversal, which gives the cashier the ability to negate, with the client present, an incorrect amount on a just-completed purchase transaction.

Food stamp refund, which is a staged transaction to be used when a food stamp client returns items originally purchased with food stamps. It requires a manager password.

Food stamp refund reversal, which is used to negate a just-completed food stamp refund transaction. It is used when the value of the refund transaction was incorrect.

Balance inquiry, which allows recipients to determine the amount of food stamp benefits remaining on the card.

Food stamp manual purchase, which stages a debit for the purchase amount to be subtracted from the recipient's EBT card at a later date. It is to be used only when the EBT terminal is not working. Recipients are limited to one manual purchase transaction not to exceed $50 outstanding at any given time.

Food stamp manual refund, which stages a credit for the amount of the refund to be added to the recipient's card. It is to be used only when the EBT terminal is not working.

Forced credit, which stages a credit to the recipient's card if the recipient is accidentally overcharged.

The descriptions for these transactions are adopted from the Direction Card reference manual supplied by Citicorp EFS to retailers participating in the system.

For security purposes, some transactions (e.g., refunds and all manual transactions) require the intervention of the manager through entry of a manager's password. Purchase and refund reversals require that the transaction being reversed be the last transaction posted to the card, the last transaction performed at the POS terminal, and that the retailer has not yet settled for the day.

current benefit balance and information on the ten most recent transactions in which the card was used (e.g., purchase, balance inquiry, refund). In addition to the embedded chip, the blue and white

Direction Card contains the state-approved logo and design graphics, the required regulatory disclosure statements on the back of the card, and a laser-engraved personal account number (PAN).

System Processor Host Computer

The EBT host computer is located at the SVS facility in Louisville, Kentucky. It initially consisted of four "fault-tolerant" processors; such processors include internal back-up of all critical components to ensure continuous processing capability. Additional processors were added, as necessary, during the statewide rollout to satisfy performance standards for central file processing. (This system also supports the Wyoming and Nevada EBT systems, and the data center also supports SVS' other lines of business, as is common among EBT processors.) SVS has a backup processing site in Nashville, Tennessee. The EBT host system is dedicated to EBT functionality, including initial account setup of recipient information from CRIS-E and the CMS, receipt of issuance-related data from CRIS-E and its delivery to recipient-selected locations for loading benefits, Direction Card updating, retailer settlement, downloading of data to retailer systems and the CMS, customer service, and reporting.

State Recipient Information System

CRIS-E is the state's integrated public assistance system. It determines eligibility and then calculates benefits for all state and federal public assistance programs for which a recipient is eligible, based on the information entered by caseworkers in each CDJFS office. Each business day, CRIS-E provides the necessary data to the CMS and the EBT host system to support card issuance and to provide recipients with their benefit allotments (including regular monthly benefits and non-recurring benefits).

Card Management System

The CMS consists of one personal computer (PC), one DataCard POS terminal,[6] and a printer. The system resides in the FCO in each CDJFS office and is primarily used to issue Direction Cards to recipients. Clerk-level activities using the CMS include card issuance and replacement, card unlock, changing a recipient's personal identification number (PIN), and converting card balances to coupons (when the recipient is present). CMS functions requiring greater security and supervisory action include dealing with forgotten PINs, converting card balances to coupons (when the recipient is not present), daily settlement, disposition of returned or damaged cards, and card inventory and control.

The CMS provides on-line access to necessary information in CRIS-E and has dial-up access to the EBT host. Records of CMS activities are printed as they occur to establish an audit trail. At the end of each day, all information entered into the CMS is uploaded to the EBT host, and the audit trail printout is filed.

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6   The POS equipment formerly marketed by DataCard is now marketed by Ingenico Corp. DataCard's financial systems subsidiary, including its POS terminal business, was sold to IVI Checkmate in 1999. Ingenico Corp. acquired IVI Checkmate in 2001.

POS Equipment

Retailers participating in the Ohio EBT system are provided with DataCard POS equipment capable of accepting the Direction Card. The POS terminal equipment configuration deployed at retailer sites is different for each of three types of retailers: single-lane stores, multi-lane stores, and route vendors.[7]

During the initial expansion of the Direction Card system, single-lane retailers received one Data-Card 680 terminal, a VeriFone P250 printer, and a pedestal mount to hold the terminal. The Data-Card 680 was a "stand-alone" terminal consisting of a built-in modem for communication to the EBT host during daily settlement, 2 megabytes of memory for database and transaction file storage, a display, a magnetic stripe and smart card reader, and a keyboard.

Multi-lane retailers are provided with a local area network-based POS configuration. During the initial expansion, the in-lane configuration consisted of a DataCard 485 POS terminal, a VeriFone P250 printer, and a pedestal mount. Multi-lane retailers also received one terminal controller (a personal computer) and one network interface controller for each 30 lanes of installed POS equipment. Like the DataCard 680, the DataCard 485 contained a display, a magnetic stripe and smart card reader, and a keyboard. All databases, transaction files, and the modem for communicating with the EBT host resided in the PC. In addition, a POS terminal programmed exclusively for balance inquiry use was offered to all multi-lane retailers redeeming over $30,000 a month in food stamp benefits.

Since August 1998, the Citicorp EFS Team has deployed DataCard Jigsaw terminals instead of the DataCard terminals described above. The Jigsaw terminal provides the same functionality as the older models, but is smaller and sturdier.[8] For multi-lane stores, the Direction Card system uses a LAN version of the Jigsaw terminal with 256 kilobytes of static random access memory (SRAM). The PC network controller for the multi-lane configuration remains the same. Single-lane stores use a stand-alone version of the Jigsaw with a modem, 640 kilobytes of SRAM, and 1.4 megabytes of flash memory.

Route vendors deliver milk, produce, or other food items directly to customers' homes, and hence cannot use a regular POS terminal. They therefore receive one speciallyprogrammed DataCard Jigsaw POS terminal, along with a battery pack to power the terminal. (During the initial expansion, route vendors received the DataCard 680 terminal.) The terminal is programmed to provide the same functionality as is present in a single-lane retailer site, except for receipt printing.

Because of retailers' concerns regarding scarce counter space in the checkout lanes, and to facilitate a more efficient checkout process, the Citicorp EFS team developed specifications for an "integrated" solution for retailers in lieu of the Ohio EBT system's "stand-beside" POS configurations (DataCard 680, 485 or Jigsaw). The integrated solution would allow retailers to modify their

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7   See FNS regulations at 7 CFR 274.12(g)(4)(ii) for the regulatory requirements related to EBT POS terminal equipment.

8   Since 1999, the Jigsaw Terminal has been marketed by IVI Checkmate Corp. (and later by Ingenico Corp.) as the eN-Counter 4000.

existing POS systems, which can accept credit cards and debit bank cards, to accept the off-line Direction Card. This approach would require retailers to attach a PIN-pad and a smart card reader to either their in-lane debit/credit terminals or their electronic cash registers (ECRs). The retailer would receive a PIN-pad and smart card reader at no cost for each lane qualified to be equipped under the terminal allocation formula. The Citicorp EFS team and ODJFS discussed whether retailers could have the option to eliminate or keep the EBT store controller personal computer. If this element were eliminated, the retailer would be responsible for maintaining the programs and files that currently reside on the EBT store controller and establishing the data transfers between the controller and the PIN-pad and smart card reader. If the EBT store controller were maintained, the retailer would be responsible only for routing the messages from the PIN-pad and smart card reader to the EBT store controller.

Regardless of the approach they take, retailers that choose an integrated solution would need to modify their existing systems' software. A detailed specification is available to retailers to assist them in identifying the necessary modifications. To date, all retailers have chosen to use the state-supplied POS equipment rather than pay to integrate the off-line EBT system with their POS systems.

Telecommunications Facilities

The EBT system's host computer exchanges data via telecommunications facilities with several organizations: ODJFS' CRIS-E system, the card management system at each CDJFS office, the system's concentrator bank (to support automated clearinghouse settlement), and participating retailers. SVS uses a combination of direct connections over dedicated lines and shared dial-up network services to support the required communications with these organizations.[9] The EBT host computer accesses the dial-up network through several dedicated communications lines; each line can handle up to 56 kilobytes of data per second (kbps).

A dedicated 56 kbps line is used to support the large batch data transfers between the EBT host and the CRIS-E system. Each business day, the EBT system transmits transaction data to CRIS-E and receives issuance information for recipients.

At least once a day, each participating retailer and CDJFS office establishes a dial-up network connection with the host computer. In single-lane retailer stores, where data transfer requirements are much smaller, the modems built into the DataCard terminals handle up to 2400 bytes of data per second. The back-room PCs provided to multi-lane retailers use a 14.4 kbps modem. For both retailers and CDJFS offices, regular telephone lines are used to transfer data back and forth to the host during daily settlement.

The PC-based CMS in each CDJFS office uses a 14.4 kbps modem to transfer information to the EBT host over the dial-up network. The CMS communicates with CRIS-E via the Ohio Data Network, which also links CDJFS CRIS-E terminals to the CRIS-E host computer. Additionally, in

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9   Compuserve is the primary provider for the dial-up network, but the Direction Card system can use an alternate network if needed.

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the larger CDJFS offices, customer service terminals provide on-line access to the EBT host system via the dial-up network.

In order to obtain up-to-date information on the authorization status of FSP retailers, CACI uses a dial-up telephone line to FNS' Minneapolis data center to access the Retailer EBT Data Exchange (REDE) system. The system identifies both authorized retailers in EBT states and retailers in adjacent, non-EBT states that have received FNS' permission to accept food stamp EBT benefits. CACI electronically updates its retailer database and forwards this information to SVS, which manually enters or updates retailer information. SVS provides retailer redemption data and recipient transaction data to FNS via tape transfer.

Finally, the EBT host routes retailer settlement data to a PC, which in turn transfers the data to the system's concentrator bank via a dial-up connection. The concentrator bank originates credits to retailers' depository institutions via the automated clearinghouse (ACH) system.

2.4   Operations Overview

Card Issuance and Training

When a recipient has been certified or recertified by a caseworker, the recipient is provided with a card authorization form indicating the recipient's name, recipient ID number, and other information (see Exhibit 2-2). If the recipient has not previously been issued a card, then the recipient is instructed to go to the FCO area.[10] There the FCO worker, using the CMS, identifies the recipient via the password identification information that is contained in the CRIS-E system. If the recipient is positively identified, the worker will automatically transfer the necessary information in CRIS-E into the CMS and proceed with card issuance. This information consists of the recipient number (used to link benefits to EBT cards) and personal data used to identify recipients when they request assistance.

The worker removes a Direction Card from inventory, updates the manual inventory control log, and inserts the card into the card reader input/output (I/O) device, a POS terminal attached to the CMS. The I/O device reads the card automatically and adds the card number to the recipient set-up information in the CMS. The recipient selects and inputs a five-digit PIN via a PIN-pad on the I/O device. The system requires double entry of the PIN before it is written to the card in encrypted form.[11] Upon completion of PIN selection, the FCO worker helps the recipient identify a maximum of three authorized retailer locations at which the recipient can load food stamp benefits by having them posted to the card. The FCO worker then enters these selections into the CMS. The CMS automatically selects the local CDJFS office as the fourth location at which the recipient can load food stamp

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10   A recipient who was being recertified and already had a card from a previous certification would be directed to the ACO. There, the ACO would verify that the recipient remembered his or her PIN and that the card was still operational.

11   The security access module in the I/O device encrypts the PIN using a data encryption standard (DES) process.

benefits.[12] Each evening, the information contained on the CMS is transferred to the EBT host system over the dial-up network. Although the CMS takes the recipient number and other identifying information from CRIS-E for use by the EBT host, the CMS does not send any information about the card or PIN to CRIS-E.

The card replacement procedure is similar to new card issuance, although a card replacement authorization form (Exhibit 2-3) must be completed by an ACO worker. After the ACO worker has verified the recipient's identity and completed the form, the recipient goes to the FCO area. An FCO worker uses the card replacement function on the CMS to cancel the old card and issue a replacement card from the county's inventory. As with new card issuances, replacements are manually logged with the recipient's signature, and the recipient selects a PIN via the PIN-pad.

New EBT clients receive training during the card issuance visit on how to use the EBT system. During training, which typically lasts about one-half hour and is conducted by ACO personnel, recipients attend a classroom session, watch a video, and obtain "hands-on" experience by completing a practice exercise using actual POS equipment.

Benefit Issuance and Loading

Each day, Ohio's CRIS-E system transfers FSP issuance information for individual recipients to the EBT host. The host processes the issuance records, links them with new and existing EBT card records using the associated recipient numbers, and readies them for downloading to the recipients' CDJFS offices and the retailer locations selected by the recipients for loading their benefits (i.e., adding the benefits to the card balance). Non-recurring benefits are downloaded during the next daily settlement process, whereas regular recurring benefits are held by the host until the assigned issuance date. Recurring monthly benefits are staggered for loading by recipients over the first 15 calendar days of each month. Each county chooses the number of issuance days for its recipients, based on the number of recipient households and other factors.

During the retailer's daily settlement of its POS system, a two-way exchange of data occurs between the retailer and the EBT host. EBT transaction data are uploaded from the retailer's system to the host, and the EBT host downloads issuance records and other staged transactions for loading by recipients. Staged transactions include refunds, purchase reversals, manual transactions processed by retailers for purchases, and forced credits. "Negative files" are also downloaded to retailers during the settlement process. Negative files contain the primary account number (PAN) of cards reported as damaged, lost, stolen, or suspect, and the system will not permit transactions with these cards. If a person attempts to use a card that has been "flagged" on the negative file, the cardholder is instructed to go to the CDJFS to resolve the situation. An authorized CDJFS staff member can obtain authorization to initiate removal of the negative flag upon determining that the card and PIN are in the possession of the correct recipient. As in a card replacement, there is a lag of two host processing cycles before the transaction to remove the negative flag takes effect and the card can be used.

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12   Although the system allows a recipient to go to any one of four locations to load each month's FSP allotment, controls are in place to ensure that any given allotment is posted to the card only once. As the benefit amount is written to the card, a sequential code known as the host reference counter (HRC) is updated in the card's memory. This code prevents multiple access to the same allotment.

Exhibit 2-2

Card Authorization Form

CARD AUTHORIZATION FORM

Assistance Group Name		Recipient Number	Date

Case Number	Food Stamp Category	Sequence	Verified SSN

Approved Applicant (no change) Reason_____

Reissue ID (no change—old ID expired)

Approved Applicant or Recipient: Duplicate Issue Fee $_____

Name or Case Number Change (no change if old ID turned in)..

Prior Name_____

Prior Case Number_____

Unit/Worker's Authorization	CSLD	Fee Paid	Rec'd By	Investor's Authorization (duplicate ID)
		$		

Recipient's Signature		Date	Recipient Verification

ID Issued By	Date Issued	ID Received By (recipient's signature)

WELCOME TO DIRECTION CARD

What is Direction Card?

A new computerized system for issuing food stamp benefits using a smart card.

How to Access Your Food Stamp Benefits?

To access your food stamp benefits, you must:

- Bring this referral
- Come to the Direction Card office on or before the date in the black box below

Your food stamp benefits will be available effective:

Where to Come and What to Expect?

At the Direction Card office you will be given your Direction Card and training on how to use it.

Note: If you do not pick up your Direction Card and access your food stamp benefits before the end of the month, your benefits will be lost for that month.

Distribution: Original to Photo ID
Copy 1 to Recipient
Copy 2 to Case file
ODHS #107 (REV. 11-94)— Direction Card Referral Only

01-063-96

Exhibit 2-3

ACO/FCO Authorization Form

OHIO DIRECTION	ACO/FCO AUTHORIZATION FORM

Recipient Name:	Date:

CARD REPLACEMENT:	COMMENTS:
Card #:	
Auth #:	
Ck Digit:	
Case No.	
No. Of Rep. Cards:	
Date of Block	

COUPON CONVERSION Recipient Present	COUPON CONVERSION Recipient Not Present	Last Trans Date
Card #:	Card #:	
Card Bal:	Card Bal:	FCO Provides
Amount:	Amount:	
Auth #:	Auth #:	
Ck Digit:	Ck Digit:	

RETURN OF BENEFITS	NEG FLAG REMOVAL	
Card #:	Card #:	
Card Bal:	Auth #:	ELPASO Approves
Amount:	Ck Digit:	
Auth #:		
Ck Digit:	ACO Signature:	

Distribution: Original - ACO
                 Copy - FCO

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On or after the specified availability date, benefits may be loaded (i.e., written to the card) at the retailer locations selected by the recipient or at the CDJFS. When the recipient performs any transaction at one of these sites, the POS terminal automatically adds to the card any benefits available for loading. Typically, benefit loading occurs during a balance inquiry or purchase transaction.[13] All available benefits must be loaded by the last day of a benefit month, although the benefits do not have to be used during the benefit month.[14] That is, once posted to the card, unused benefits can be carried over from one month to the next.

The EBT host also downloads the issuance and staged transaction files to each CDJFS office as the offices perform their daily settlements. Recipients can load benefits at the CDJFS office as well as at selected retailer sites. Recipients might elect to load their benefits at the CDJFS office if they have other business there. Also, benefit issuances may be available sooner at the CDJFS office than at selected retailers, because retailers often choose to settle their POS terminals and download benefit issuances at the end of the day. (Each retailer chooses the time for automatic or manual settlement of the POS terminal.) Each CDJFS performs settlement of its POS terminals every weekday morning so that benefits staged overnight are available for loading.

Benefit Redemption

Food stamp benefits are redeemed through the execution of EBT purchase transactions. The recipient inserts the card into the POS terminal and enters a PIN. Upon a successful PIN verification, the POS terminal displays the recipient's FSP balance on the card. The cashier rings the grocery order, and at the conclusion of the transaction, the cashier enters the food stamp purchase amount. The POS terminal displays the purchase amount for the recipient to validate. The recipient validates a correct total by pressing the "yes" key on the keypad. If the "no" key is pressed, a new purchase amount must be entered by the cashier and the recipient must again validate the transaction. Both an EBT receipt and a cash register receipt are provided to the customer. The EBT receipt indicates the beginning card balance, the purchase amount, and the ending card balance.[15] Because the system uses smart card technology, the transaction is recorded both on the recipient's smart card and on the retailer's system. Each recipient's smart card retains a transaction history comprising the last ten transactions executed, and the retailer's system retains all POS transactions in memory until retailer settlement occurs. At settlement, the transaction data are uploaded from the retailer to the EBT host. The account balance for each recipient is maintained on the EBT host and on the Direction Card. Therefore, with the off-line system, there are two balances for each recipient: a card balance and a EBT host-derived balance. The host-derived balance, however, will not reflect transactions performed since retailer settlement.

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13   In an on-line system, benefits are automatically posted to the recipient's account maintained by the host computer on the benefit availability date and do not expire at the end of the benefit month.

14   If a benefit is made available after the 15th day of the month, it must be loaded by the last day of the following month.

15   The receipt will also reflect any automatically posted activity, such as issuances, other staged credits (e.g., refunds), and staged debits for manual transactions in calculating the ending card balance.

Manual Transactions

Retailers can choose to perform manual transactions for recipients when the store is unable to process any regular POS transactions in any equipped lane. To use this option, the retailer must accept the financial risk for the manual transactions (up to $50 per transaction) and sign a contract rider agreeing to the applicable procedures. Manual transactions differ from regular transactions because the Direction Card is not used. Instead, the store calls EBT Customer Service to request approval for the transaction; the retailer provides the recipient name, PAN, purchase amount, store number, and the type of manual transaction[16] to the Customer Service agent. Customer Service enters the transaction information into the EBT host. The system checks the negative file, the host-derived balance, and any outstanding manual transactions for the card. If the transaction is approved, based on the host-derived balance, the EBT host assigns the transaction an authorization number, provides a check digit (a number generated through a mathematical algorithm that is used to verify that the underlying information was entered into the system correctly), and places the transaction in a pending file. The Customer Service agent provides the authorization number to the store cashier, who completes a manual transaction receipt. The recipient signs the receipt, and the retailer provides one copy to the recipient and keeps the other copy.

When the system becomes available, the information from the manual purchase receipt must be entered into the retailer's POS system. The entry of the manual transaction information into the system requires the use of the manager's password.

Retailers receive credit for manual purchases after the EBT host receives an acknowledgment that the transaction has been written to the recipient's card. Manual refunds and forced credits are included in a retailer's settlement on the day they are entered into the POS system.

Retailer Settlement

The process for reimbursing retailers for food stamp redemptions begins with the retailer's daily settlement with the EBT host. The retailer chooses a convenient time for performing the end-of-day settlement transaction. Retailers can activate settlement each day, but many retailers choose automatic daily settlement, with settlement initiated automatically at a specific time each day. When retailers settle, the POS system accesses the EBT host. All POS transactions conducted at the store since the last settlement are uploaded to the EBT host, and the negative files, issuance records, and other data are downloaded to the retailer.

Upon receipt of the retailer settlement data, the EBT host verifies that the retailer identification is valid and that the detail records in the batch equal the totals in the header and trailer records. The host also assigns a settlement reference number that is unique to the retailer and to the batch. A confirmation receipt indicating a successful settlement is printed at the retailer terminal. The receipt includes the retailer name, address, and phone number; the settlement amount; and the settlement reference number. Successfully performing end-of-day settlement clears all transaction data from the retailer's system.

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16   Codes are used to identify three types of manual transactions: purchases, refunds, and forced credits.

The retailer is required to retain the day's receipts until the settlement amount is deposited in the retailer's bank account. If the retailer's POS equipment fails to settle properly with the EBT host, the retailer can submit the receipts to SVS and request restoration of the transactions.

The Federal Reserve system maintains an automated clearinghouse (ACH) network for handling electronic funds transfers between member banks, and this network is used to reimburse retailers for the net total of their daily EBT settlement. After the Direction Card system settles with each retailer at the end of the day, the EBT host prepares an ACH file with records indicating each retailer's depository institution and the amount of funds to be deposited to the retailer's account. SVS sends this ACH file to the system's "concentrator" bank. In both on-line and off-line EBT systems, the concentrator bank must be a member of the ACH network. The concentrator bank serves as an intermediary in the settlement process, temporarily providing funds for transfer to retailers' accounts and then being reimbursed from an EBT account maintained at the U.S. Treasury.

The concentrator bank sends the file to the ACH network. The network debits the concentrator bank's account at its Federal Reserve Bank for the total value of the daily settlement and transfers funds to each retailer's depository institution. The off-set for the transfer of funds from the concentrator bank to the retailers' receiving depository institutions will be a credit to the bank's Federal Reserve account. The credit results from a request made each day to the Automated Standard Application for Payments (ASAP) system operated by the Department of Treasury. The ASAP system verifies that funds are available through the state's EBT letter of credit. After the availability of funds is confirmed, the Department of Treasury sends the ACH credit entry to the concentrator bank's account at the Federal Reserve Bank, completing the reimbursement process.

2.5   Differences Between the Direction Card and PayEase Card Systems

The Direction Card system is built directly on the PayEase system. The differences between the two systems represent a set of incremental improvements to the PayEase system. Several of the changes were identified during the PayEase pilot operations, and some were partially implemented or tested prior to the start of the Direction Card's statewide rollout. Other changes resulted directly from the specifications issued in the state's RFP for a statewide EBT system. Taken together, the changes are designed to provide a more efficient, effective, and secure system.

The basic differences between the Direction Card and PayEase systems can be grouped into four main areas: equipment, operational improvements, reporting, and security. The main changes within each of the four areas are summarized below.

Equipment

- *New smart card*. The Direction Card system uses the PayFlex smart card from Schlumberger. This card replaces the Schlumberger ME2000 card used for the PayEase system. The PayFlex smart card was selected because it provides the range of features needed to

be compliant with EMV standards,[17] the capability to establish several "electronic purses" for use with multiple benefit programs, and the ability to provide for an increased level of security over value-adding transactions. (For instance, the chip within the PayFlex card can be programmed to perform the security functions that were previously performed by the POS software during the PayEase pilot.)

- *Host system upgrade*. In order to meet the processing and performance standards requirements of a statewide EBT system, the EBT host system was upgraded to Tandem's Himalaya family of systems, with K2002 RISC-based processors replacing the Tandem CLX Model 800 processor used for the PayEase system.

- *POS terminal equipment*. The PayEase pilot used a POS configuration based on retrofitted VeriFone equipment. Significant software development was required to enable the system to exchange data with the smart card reader. During the pilot, a multi-lane DataCard 485 POS platform was tested and implemented in several large stores. The application was then adapted to a single-lane configuration using the DataCard 680, and successfully tested in one store. The DataCard POS platform is being used in all retailer locations for the statewide Direction Card system. Beginning in 1998, the Data Card Jigsaw POS terminal has been deployed in stores added to the Direction Card system.

- *Remote software download*. The DataCard POS platform makes it possible to download new software releases remotely for all POS terminals and the personal computers used in multi-lane stores. This capability was tested and used in those stores that had the Data-Card POS platform installed during the PayEase pilot. Previously, a technician had to visit the store to install upgraded POS software.

- *New balance inquiry-only terminal*. In order to provide recipients with easy access to their card balances, a separate stand-alone balance inquiry terminal was developed using a VeriFone SC45 card reader/PIN device. This device can be placed anywhere within a retail establishment.

Operational Improvements

- *Elimination of manager cards*. The PayEase pilot used a manager card to complete POS functions requiring the added security of supervisory personnel intervention, e.g., refund or manual transactions. This approach became somewhat problematic as the cards and PINs were frequently lost and the cards sometimes failed, resulting in delays in the checkout lane.

  The Direction Card system eliminates the use of manager cards and instead uses manager passwords. As many as ten manager passwords can be assigned by each retailer at any given time.

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17   Europay, MasterCard and Visa (EMV) have jointly defined a set of standards for use of smart cards in payment systems. See "EMV '96, Integrated Circuit Card Specification for Payment Systems," 1998.

- *Elimination of duplicate card lock*. Duplicate card lock prevents the issuing of multiple cards to the same recipient. In the PayEase pilot, the EBT host was programmed to suspend any card setup record received from the CMS if the recipient ID was already on the EBT host and was associated with an active card. The second card was effectively "locked," because no benefits would be directed to it. Benefits received by the EBT host from CRIS-E would be directed to the card associated with the first setup record. Any card that was locked would be reported to customer service, which would then contact the pilot CDJFS office that issued the second card.

  Although effective in a confined pilot area, many believed that this process would prove too cumbersome to manage when the state began to implement statewide, and recipients moved and changed households over a greater geographic area not under the control of one CDJFS office. Therefore, in the Direction Card system, the EBT host was modified so that the newly issued card is not locked when an active card for the recipient exists on the EBT host. Instead, the EBT host automatically performs a card replacement transaction when a duplicate card condition exists. This process transfers any remaining value to the new card and blocks the previous card.

- *Regionalization of negative file.* The PayEase pilot sent all negative records to all retailers. With the planned growth of the Direction Card system to statewide operations, it was recognized that the size of the statewide negative file would probably exceed the memory capabilities of the DataCard terminals used by single-lane retailers. The concept of "regionalization" was therefore developed to minimize the size of the negative file needed at single-lane locations.

  Under regionalization, single-lane retailers receive a negative file that contains records of blocked cards issued only to recipients at CDJFS offices within the retailer's region. ODJFS and the Citicorp EFS team define regions on the basis of caseload size and usage patterns. Usually, a region includes a county and at least a portion of the immediately surrounding counties. Depending on the combined size of the caseload served by these counties and the extent of cross-county shopping patterns, additional counties at the edge of the region might be included as well.

  A code designating the retailer's region is downloaded to single-lane terminals. In addition, a code indicating the recipient's county of residence is added to the memory within the recipient's Direction Card. At the start of each EBT transaction at a single-lane retailer, the POS terminal compares the retailer's region to the county code on the recipient's card. If there is a match, the transaction continues processing. If there is not a match, the terminal requests entry of an authorization number. The retailer must call Customer Service to determine that the card is valid and to receive an authorization number. Once this number is received and entered, the transaction can proceed.

  As described in Chapter 4, the system began implementing the regionalization feature when retailers in the Cleveland area began converting to EBT.

- *Forced clear batch*. A "batch" is a group of EBT transactions that has not been sent from the retailer's POS system to the EBT host for settlement. The PayEase pilot allowed retailers to clear their batches from their POS systems with the use of a manager card. To eliminate an inadvertent erasure of the POS database prior to the completion of a successful settlement, an authorization code from Customer Service is now required as part of the process to initiate the clearing of a batch from the POS system.

- *On-line terminal access to the EBT host*. To enhance the efficiency of ACO workers in the larger county offices, these staff are being provided with on-line access to the EBT host via Customer Service Terminals (CSTs). The primary use of the CSTs is obtaining authorization codes for card replacements. ACO workers also use CSTs to research benefit issuance problems.

- *Improved terminal messages*. The messages displayed by the POS terminal were updated and clarified to make the system easier for retailers to use.

Reporting

- *On-line history*. The availability of on-line transaction history was increased to 120 days for statewide rollout. Only 90 days of history was available during the PayEase pilot.

- *Lost and stolen cards*. A daily report of lost and stolen cards was created that includes the PAN, recipient number, reason code, date and time reported, and totals by reason. Prior to this enhancement, county workers manually tracked cards reported as lost and stolen. In addition, the EBT host will automatically provide the count of previous replacements for a lost or stolen card anytime an authorization is requested for a card replacement, so that the CDJFS can identify recipients with a high rate of replacements.

- *Stale-date notices*. The PayEase system automatically identified all cards with a "stale" balance that had been inactive for 60 or 90 days. This information was sent to CRIS-E, which generated "stale date" notices to be mailed to the recipients. The Direction Card system also identifies cards with "stale" balances, but it allows the state to set a dollar value threshold below which a notice would not be sent CRIS-E, preventing the generation of a notice to the recipient. The threshold is still set so that any card with a non-zero "stale" balance is included in the notices.

- *POS card history.* Under the new system, an additional field of information is being recorded for each transaction maintained on the card, namely, the Category of Public Assistance (COPA) designator. The Direction Card system is designed to accommodate multiple benefit programs, unlike the food stamp-only PayEase pilot. With a multi-program card, the additional COPA information is necessary to allow recipients to identify what type of benefits are being used for each transaction.

Security

- *Additional use of key security*. The PayEase pilot included a "key" encryption strategy for all value-adding transactions that were generated by the EBT host and added to the card at the POS.[18] New security measures were needed for two reasons: first, the Direction Card system would serve a much larger number of recipients and retailers, and second, retailers would be allowed to integrate the EBT functions into their POS systems. The system designers introduced three additional security measures. The first was to create a unique key for each card, in place of a single master key for data encryption. This would ensure that, in the very unlikely event that the key was "decoded" for one card, the entire system would not be in jeopardy. The second was to add an industry-standard method of message authentication codes (MAC)[19] to POS transactions as they are created and stored on the retailer's POS system. Special keys maintained on the cards would be used to create the MAC that would be "decoded" when the transaction reached the EBT host. MACs also were added to credit transactions staged at the EBT host. The third measure was the addition of a card issuer key to support interoperability among States and other entities with their own versions of the Direction Card system.

- *Staging of purchase refunds and reversals*. In the PayEase pilot, a recipient received immediate credit (i.e., value added back to the card) for all purchase transactions that were reversed and for refunds of all or part of a prior purchase. With the Direction Card system, these transactions are still allowed, but they are not instantaneous. First, the transactions are uploaded from the POS system to the EBT host and then downloaded to the recipients' chosen issuance sites for posting to the card. This process allows for all value-adding transactions to be verified by the EBT host and the card prior to their entry into the EBT system. This change was added as an additional security measure that would be necessary if retailers were to integrate their store cashier systems to interact directly with the Direction Card. With integrated systems there would be no other method to prevent retailers from adding value into the system.

2.6   Support for Additional Benefit Programs

Unlike the PayEase system, the Direction Card system has been developed with the capability to become a multi-program EBT system. The contract between ODJFS and Citicorp EFS includes an option to add Temporary Assistance to Needy Families (TANF) cash benefits to the Direction Card system. The basic system design is structured to facilitate the use of the system to deliver TANF benefits, but additional development would be required to make this capability operational. ODJFS EBT staff made substantial efforts to address the challenges of planning an off-line EBT system for

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18   A "key" in encryption is a data string that, when combined with a source of data and an algorithm, produces output that is unreadable until it is decrypted.

19   Message authentication refers to any method used to determine the source of data and whether the data was intentionally or unintentionally altered during the transmission process.

TANF, which include access to cash and the flow of funds for settlement. The ODJFS Director subsequently chose not to exercise the TANF option.

The Ohio Department of Health (ODH) contracted in November 1999 with Citicorp EFS to design, develop, implement and operate an off-line EBT system for the WIC program. The WIC EBT system shares the Direction Card host and POS platforms, and each household receiving both WIC and FSP benefits is issued a single, multi-purpose smart card. For WIC and joint WIC/FSP recipients, the pilot system uses a version of the Schlumberger Payflex card with 4 kilobytes of memory (rather than the 1 kilobyte version used for the statewide FSP EBT system). The Ohio WIC/FSP EBT system is based on the WIC/FSP EBT system developed by SVS for Wyoming, and SVS is the processor for both systems. In October 2000, the combined WIC/FSP EBT system became operational on a pilot basis in Montgomery County.

For WIC, benefits are issued in the form of designated quantities of WIC-approved foods prescribed by local WIC staff. This information flows from the WIC program data system to the SVS EBT host on a daily basis, and then the benefit data flow to the recipient's card through the same set of processes as is used to issue FSP benefits. The purchase transaction process is similar, but the barcode on each WIC food item must be scanned, so that the EBT POS system can check whether the item is authorized for WIC and whether the quantity purchased is equal to or less than the remaining balance for that food category on the card. The total value of the WIC purchase transaction is determined later during the settlement process, based on price data supplied by the retailer and item price limits set by ODH.

In the Montgomery County pilot site for the WIC/FSP EBT system, the CDJFS has been equipped with a new version of the CMS programmed to perform all necessary functions on the new version of the Direction Card. Unlike previous versions, the WIC/FSP CMS uses a Pentium-class PC with the Windows operating system. The CMS software includes enhancements to the FSP functionality. Local WIC offices are equipped with a similar Windows PC, but they use software developed by another state contractor to combine the WIC client information system and CMS functions.

For the pilot, all cards issued by the FSP and WIC offices are capable of handling both programs, and any office can perform CMS functions on any card.[20] Whichever program first certifies the recipient issues the Direction Card; if the other program certifies the recipient, the new benefits are linked to the existing card. Recipients select separate issuance sites for WIC and FSP benefits, but the same sites can be used for both programs if they are authorized to do so.[21]

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20 There is one exception to this compatibility. The FSP office CMS cannot write information to the FSP-only (1 kilobyte) smart card previously issued in Montgomery County and currently used in the rest of Ohio.

21 The WIC program has more restrictive authorization criteria than the FSP, so only a subset of FSP retailers can be issuance and redemption sites for both programs.

The WIC/FSP EBT pilot is expected to continue operations until June 2003, at which time it may be expanded. After ODH evaluates the pilot results, the agency will decide whether to continue or expand the WIC/FSP EBT system, potentially on a statewide basis. This decision is subject to FNS approval.[22]

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22   The scope of the evaluation conducted by Abt Associates for FNS is limited to the FSP portion of the Direction Card system. Volume 2 of this report includes projections of the potential impact of adding WIC (or TANF) on EBT operating costs for the FSP.

Chapter 3
System Design and Development

3.1 Introduction

As noted in the previous chapter, the Direction Card EBT system differs somewhat from its predecessor, the pilot PayEase system. Thus, before the state and vendors could begin statewide expansion, they needed to modify the design of the existing EBT system and develop the new software. This chapter discusses the activities involved in this design and development effort. It is organized into the following four sections:

- contract procurement;
- system design;
- system development; and
- system testing.

3.2 Contract Procurement

The RFP for the off-line EBT project originally allocated a little over 14 months for system design and development activities. With a planned contract start date of October 3, 1994, this meant that the EBT vendor was to begin installing equipment in Montgomery County by early December 1995. Recipient conversion in Montgomery County was to begin by April 1996. A series of unexpected delays in the procurement process, however, put the project about 18 months behind schedule, with recipient conversion in Montgomery County starting in September 1997. A number of factors contributed to the delay, including extensions to the due date for vendor proposals, delays in awarding the contract, and delays caused by the lawsuit. Exhibit 3-1 presents key milestones in the procurement process.

The initial procurement process itself took about one year longer than expected. Ohio issued two addenda to the RFP, which pushed the due date for vendors' proposals back about two months. The first addendum indicated that the Ohio Department of Health would be considering using the EBT system for the delivery of WIC benefits (although vendors did not need to make an immediate response). Also, EBT terminals deployed in retail stores had to be capable of performing third-party on-line functions as well as off-line transactions, if the retailer opted to integrate the off-line EBT system with the in-store payment system. The second addendum clarified the process by which vendor proposals would be evaluated. Even after proposals were received in July 1994, the process of reviewing and evaluating the proposals, and then negotiating a final contract, took until September 20, 1995. Owing to the novelty of the proposed off-line technology, the evaluation panel had numerous questions that had to be addressed before a contractor could be selected.

Exhibit 3-1

Key Procurement and Contract Events

1993

| March 1 | Original end date for PayEase demonstration. FNS agrees to extend its contract with NPC by eight months, with ODJFS assuming responsibility for contract costs. |
| November 1 | FNS extends contract with NPC by five months. |

1994

February 28	ODJFS issues RFP for development, implementation, and operation of the Ohio EBT system.
April 1	FNS extends contract with NPC by nine months.
May 12	ODJFS issues RFP Addendum #1.
June 27	ODJFS issues RFP Addendum #2.
July 21	Vendors submit their proposals to ODJFS.

1995

January 1	FNS extends contract with NPC by six months.
January 17	Citicorp EFS responds to ODJFS clarification request.
July 1	FNS extends contract with NPC for fifth and last time.
September 20	ODJFS signs EBT contract with Citicorp EFS.
October 27	NPC files suit against Citicorp EFS and the state.
November 9	Preliminary hearing on NPC's legal action begins.

1996

January 18	Judge rules in favor of NPC, directs Ohio to re-solicit cost proposals from Citicorp EFS and NPC.
April 25	Citicorp EFS submits revised Final Proposal, including SVS (a subsidiary of NPC) as subcontractor.
June 17	Ohio approves revised proposal.
September 3	FNS contract with NPC expires. Ohio contracts with SVS to continue pilot operations until December 31, 1996.
December 17	FNS approves Direction Card system.

1997

| January 1 | Direction Card system begins operations in Montgomery County pilot area under contract with Citicorp EFS. |

The one-year delay created some concern due to the contract status of the pilot EBT system in Montgomery County. FNS' contract with NPC for PayEase operations was originally scheduled to end March 1, 1993. When it was clear that ODJFS wanted to continue pilot operations until a state-wide system could be procured, FNS agreed to extend its contract with NPC.

After ODJFS awarded the EBT contract to Citicorp EFS in September 1995, efforts to begin development of the statewide EBT system slowed, and then stopped, due to a legal challenge to ODJFS's contract award to Citicorp EFS. On October 27, 1995, just three days before the scheduled kick-off meeting for the Ohio EBT project, NPC filed a lawsuit seeking a preliminary injunction to prevent Ohio from pursuing development of a statewide EBT system with Citicorp EFS. The basis of the suit was an allegation that Citicorp EFS's cost proposal had not been prepared strictly in accordance with the requirements of the RFP, making it difficult for the state to compare NPC's and Citicorp EFS's proposed costs. During a preliminary hearing in November, the court found no grounds for issuing a temporary restraining order or a preliminary injunction, but it did warn Citicorp EFS that any continued contract activity would be at its own risk. Then, in January 1996, the court found in favor of NPC and directed the state to re-solicit cost proposals from Citicorp EFS and NPC.

A period of negotiations ensued between Citicorp EFS and a new subsidiary of NPC, Stored Value Systems (SVS). Citicorp EFS agreed to drop its plan to develop an off-line EBT system from scratch and to include SVS as a subcontractor in its proposal to Ohio. Under this proposed contractual arrangement, SVS would serve as processor for all EBT transactions, whereas Citicorp EFS would remain as prime contractor. Century Technologies, Inc. (CENTECH), another subcontractor to Citicorp EFS, would be responsible for deploying and maintaining POS devices at retailer locations and in county welfare offices. (CENTECH was later purchased by CACI International Inc., so this report refers to the firm as CACI.)

Citicorp EFS submitted its revised proposal to Ohio in April 1996, and Ohio approved the proposal on June 17, 1996. A second kick-off meeting for the project was held on July 9. Thus, the lawsuit delayed the start of contract activities by about eight months. During the entire procurement period (i.e., from March 1, 1994 through September 3, 1996), FNS extended its contract with NPC a total of five times. The State of Ohio then contracted with SVS to continue operating the pilot EBT system in Montgomery County through the end of 1996, in order to provide time to design and develop the new Direction Card system.

3.3 System Design

Usually there are three distinct phases associated with moving from a paper benefit issuance system to an EBT system: the design phase, the development phase (which includes system testing), and the implementation phase. Although these phases are normally carried out more or less in succession, design and development activities for Ohio's Direction Card system were co-mingled for two reasons. First, the pilot EBT system had already been designed and needed only a few design modifications before statewide expansion. Second, the developer of the pilot system was part of the Citicorp EFS project team, and the team had full access to software already developed for the pilot system.

As described below, an EBT system's design phase encompasses two major tasks. The first task is to decide exactly how the system will meet the EBT functional requirements specified in FSP regulations and the vendor's contract. The second is to prepare a "detailed system design document" to explain the planned design to state and federal officials. Although other activities are often initiated during the design phase to ensure completion before the system is implemented, they are not central to the design process.[1] Exhibit 3-2 identifies the critical design and development milestones.

Table 3-2

Key System Design and Development Events

July 1993	ODJFS submits Planning Advanced Planning document to FNS.
February 1994	ODJFS issues RFP for the Ohio EBT food stamp benefits distribution system.
September 1995	ODJFS signs EBT contract with Citicorp EFS.
October 1995	Initial kick-off meeting for the Ohio EBT project.
June 1996	Ohio approves revised proposal.
July 1996	Second kick-off meeting for the Ohio EBT project (discussed planned changes to system).
	County Advisory Board members observe demonstration of pilot system in Montgomery County.
August 1996	County Advisory Board meets with ODJFS and vendors to discuss planned system design.
	Citicorp EFS submits draft Detailed System Design Document.
	First formal meeting with retailer groups to discuss system design issues.
September 1996	Citicorp EFS submits revised Detailed System Design Document.
October 1996	Citicorp EFS team meets with Ohio and FNS to work through final questions regarding system design.
	Citicorp EFS submits final version of Detailed System Design Document.
	Second formal meeting with retailer groups to discuss system design issues.
	FNS responds with comments on draft Acceptance Test Plan.
December 1996	Citicorp EFS team begins three-day acceptance test of EBT system.
	FNS approves Direction Card system.
January 1997	Direction Card system begins operations.
February 1997	Citicorp EFS submits the Direction Card Risk Analysis Report.

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1   These other activities, which are discussed later in the chapter, include development of various materials, including a system implementation plan, training materials, and draft language for EBT contracts with retailers.

System Design Activities

The RFP for the EBT project delineated the functional specifications for the planned system (i.e., what the system had to do) as well as other design requirements, including required levels of system performance, processing speeds, reliability, security, disaster preparedness, and client ease of use. Initial design work on these requirements began as early as late 1995, when the original Citicorp EFS project team met first with ODJFS and then with retailers to discuss the planned EBT system. These design activities came to a halt on January 18, 1996, however, when the court directed the state to re-solicit cost proposals from Citicorp EFS and NPC.

Design efforts began again when representatives from Citicorp EFS, SVS, CACI, and ODJFS met for the project's second kick-off meeting on July 9, 1996. The design task was now quite different than before. Instead of designing and developing an off-line EBT system from scratch, the new Citicorp EFS team could base its efforts on the pilot system already developed by SVS. Although this clearly represented a significant reduction in needed design effort, eight months had passed since the project's initial kick-off meeting. The new system had to be developed, tested, and ready to process EBT transactions in less than six months (i.e., by January 1, 1997).

The Citicorp EFS team brought to the meeting a document describing both proposed general enhancements to the pilot system and modifications requested by the RFP. (Some of the general enhancements had already been implemented by SVS as part of the pilot.) Team members went through the proposed changes one by one during the meeting, seeking agreement from ODJFS and FNS representatives so that work on the Detailed System Design Document could begin. Changes receiving the most attention are listed in Exhibit 3-3.

Exhibit 3-3

Proposed Changes to System Design

Eliminate the need for a manager card to initiate special functions at retail outlets—use manager passwords instead.

> Adopted.

"Regionalize" the system's negative file for single-lane retailers.

> Adopted.

Ensure a recipient's ability to obtain a transaction history at the store upon request.

> Adopted.

Enable EBT cards to handle two PIN numbers so that a designated "alternate shopper" could use the card.

> Not adopted. Citicorp EFS indicated that this FNS request would not be possible if the card was to conform to industry standards adopted for smart card functionality and security.

Eliminate immediate store refunds to a client's card.

> Adopted.

Although not discussed much at the meeting, several new features of the system would entail significant design and development effort. All of the Verifone POS terminals used during the pilot were to be replaced with DataCard POS terminals, and the system would switch to new smart cards. These changes were not simply equipment upgrades. The Verifone POS terminals handled much of the pilot system's transaction processing and security functions. Because the RFP for the new system required that retailers be offered an "integrated" terminal solution if they wanted one terminal to handle both (off-line) EBT and (on-line) commercial credit or debit operations, the EBT vendor would no longer have complete control over terminals handling EBT transactions. For security reasons, the Citicorp EFS team therefore needed to move processing and security functionality out of the terminal and into the card itself. The new card manufactured by Schlumberger could handle this added functionality. Furthermore, it had the capacity to maintain and process benefit information for more than one program, which was crucial in light of ODJFS' interest in ultimately adding other programs to the EBT system.

Another issue discussed during the design phase was what came to be known as the "association/ disassociation" issue. The basic point here was what to do if a food stamp household split into two program-eligible households. After discussion of solutions offered by the Citicorp EFS team and ODJFS, an agreed-upon process was adopted shortly before the system's acceptance test. The new process required both software changes at the system's host computer and procedural changes at the county office.

Input from County Advisory Board

After the initial EBT contract award to Citicorp EFS, ODJFS formed a County Advisory Board to provide input to the EBT planning and implementation process. Montgomery County took the lead in organizing the board, which included representatives from six counties within the state.[2] Board members met in Montgomery County in July 1996 to observe a demonstration of the pilot EBT system. They then met the following month with ODJFS and the Citicorp EFS team to discuss the proposed design of the new system.

Input from Retailers

ODJFS also sought input from several retail groups in Ohio, including the Ohio Grocers Association (OGA), the Ohio Council of Retail Merchants, and key supermarket chains. Despite the success of the off-line pilot, OGA and a number of retailers initially tried to dissuade ODJFS from pursuing an off-line system for statewide expansion, arguing that on-line technologies were already proven and more compatible with grocers' POS systems. When the decision to go with an off-line system had been adopted, however, the retailer groups worked with the state on system design, cost, and implementation issues.

The main features of the planned design were presented to the retailer groups at an August 23, 1996 meeting, following distribution of the draft Detailed System Design Document. The OGA's EBT Task Force then responded with a document entitled "General Concerns and Positions." The task force identified the following major concerns:

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2   The six counties were Montgomery, Belmont, Cuyahoga, Franklin, Hamilton, and Henry.

- The state and Citicorp EFS were trying to implement the system too quickly to allow OGA and the retailer community sufficient time to review the system design, its operating rules, and specifications for equipment configurations.

- There was little or no information available regarding when the system would be implemented in different parts of the state.

- No written procedures were available for how cross-border transactions would be handled.

- There was little or no information about plans for "retailer integration," which referred to how off-line (EBT) and on-line (commercial debit and credit) functions would be integrated into a single terminal.

- The state was not planning to pay for deploying POS equipment at all checkout lanes in most multi-lane stores.

ODJFS immediately responded with a letter addressing the retailer concerns. The letter noted that the rushed schedule applied only to the conversion of retailers in Montgomery County to the new system. Thereafter, more time would be available for retailers to review documents and provide comments. With regard to cross-border shopping, the letter said that county offices would conduct surveys of recipients to determine whether any out-of-state stores needed to be included in the system. The letter also said that ODJFS and Citicorp EFS would be offering retailers several options regarding POS system integration, but that specific rules had not yet been developed. Finally, with respect to lane coverage, the letter indicated that ODJFS would be complying with FNS rules that tie the number of lanes to be equipped (at no cost to the retailer) to the monthly level of food stamp redemptions at the store.

A second meeting with the retailer community took place in October 1996. Several of the retailers' original concerns remained (e.g., lane coverage and integration of on-line and off-line functions), and others were brought to the attention of ODJFS. In particular, the new issues were:

- staging of purchase reversal refunds; and
- regionalization of negative file.

Retailers did not like the planned staging of refund credits to client accounts, because clients would not have access to the refunded benefits for at least a day or two. Not only did this represent a potential loss of sales to the store, it also meant that store employees would likely be dealing with angry clients.[3] Retailers also were concerned about plans to regionalize the system's negative file. They worried that checkout productivity would be reduced due to the need to call Customer Service when an out-of-region client shopped at their store. ODJFS' response to retailers' concerns about the

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3   For example, suppose a client with $47 of benefits in her EBT card attempted to buy $4.50 in groceries, but the store clerk inadvertently keyed $45.00 as the EBT purchase amount. She would not be able to access the refunded benefits until they were posted to her card at a selected store a day or two later.

staging of purchase reversals and the regionalization of negative files was to explain that security concerns necessitated the adoption of these design features.

A third meeting with the OGA occurred late in January 1997. By this time most purely design issues had been dealt with, so retailer concerns switched to issues relating to system implementation, including:

- Citicorp EFS's proposed retailer agreements;
- equipment footprints;
- service agreements; and
- costs associated with additional terminals and supplies.

Retailers also were concerned that the off-line system left them vulnerable to losses related to manual transactions. In an on-line EBT system, manual transactions are permitted when the store's EBT terminal is not working or when communications with the host computer cannot be established. In these situations the retailer has the option of calling customer service for manual authorization of the requested transaction. If customer service can access the EBT database, the availability of sufficient funds in the recipient's account can be checked and authorization provided. If customer service cannot access the database, then the recipient's remaining balance is unknown and the store assumes the risk of not being reimbursed if it proceeds with the transaction.

In an off-line EBT system, in contrast, customer service does not know the recipient's current remaining balance; that information is contained only in the recipient's EBT card. Therefore, if an EBT terminal is not working, there is no way of knowing whether the recipient's remaining EBT balance is sufficient to cover the intended purchase. For this reason the system limits manual transactions to $50, and retailers assume full risk for not being reimbursed. It is the retailer's option of whether to process manual transactions.

Manual transactions are likely to be needed less often in an off-line system than in an on-line system, because an off-line system does not rely on communications with the host computer to gain authorization.

Detailed System Design Document

A basic federal requirement for EBT systems is the preparation of a Detailed System Design Document. The box below shows a summary of the Ohio RFP's requirements for system design documentation.

Preparation and review of system design documents has often been challenging and time-consuming for EBT vendors. One reason for these difficulties has been that vendors are reluctant to provide information on the detailed specifications of their proprietary software, especially in a document that is circulated outside the vendor's organization, regardless of state and federal protections for confidential information. Another reason is the multiple layers of extensive review such documents receive. The detailed information and extensive reviews have been necessary because system design documentation is used by FNS to prepare for system testing, which is the point at which FNS approves the operation of an EBT system.

System design documentation will consist of two parts:

1. The Functional Description shall describe the operating environment of the project, focusing on procedures and work flow. It shall address procedures, a summary of improvements over the paper coupon issuance process, and organizational, operational, and developmental impacts of an off-line EBT project.

2. The System Specification shall address the design of system components. It shall identify the selected technology and include system performance requirements, expected data accuracy and validity. It will identify data elements, system interfaces, system security and the total system component configuration.[*]

[*] RFP, pp. 64-65.

As in previous efforts to design EBT systems, final approval of Citicorp EFS's Detailed System Design Document also proved difficult and time-consuming. According to document reviewers, the biggest concern was a lack of sufficient detail on exactly how the system would operate. The number of parties involved in the review process also contributed to the length of time to reach an approved final system design, although each party added an important perspective.

Citicorp EFS submitted the first draft of the document to ODJFS on August 20, 1996 (before the previously mentioned August 23 meeting with retailers). SVS had the primary technical role in designing the system, but Citicorp EFS had final responsibility for all documentation. According to reviewers at ODJFS, the document was too much a restatement of the April 1996 proposal and lacked the detail—including flow charts—needed to evaluate the planned system fully. Citicorp EFS then submitted a revised and—according to ODJFS—much improved document on September 13. A meeting in Columbus was convened on October 7, 1996 to go over ODJFS' and FNS' remaining comments on the system design. Most of the meeting centered on detailed design questions posed by representatives from Booz•Allen and Hamilton.[4] These questions sought clarification on security issues (e.g., system use of passwords, separation of critical functions, use and management of encryption keys) and communications protocols between terminals and the host computer. By the end of the meeting, FNS and Booz•Allen seemed satisfied with the information they had received. The final version of the document was submitted on October 15, 1996, and subsequently approved by FNS and ODJFS.

Aside from the need for greater detail on planned system design and operations, several issues were discussed during the document review process. One was ODJFS' request that FNS waive the requirement that all stores authorized to participate in the FSP be equipped with EBT terminals. Because of cost considerations, ODJFS did not want to deploy POS terminals in stores redeeming

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4   The consulting firm of Booz•Allen and Hamilton was under contract to FNS to help evaluate the technical and security aspects of the Ohio EBT system.

less than $100 in food stamp sales per month. ODJFS instead wanted these retailers to process manual transactions for their limited number of food stamp sales. FNS rejected the request because, as described earlier, customer service has no way of knowing a recipient's current EBT balance when processing manual transactions in an off-line EBT system. In addition, this cost-cutting feature was not in ODJFS' negotiated contract with Citicorp EFS. Adopting this policy would have reduced costs to the EBT vendor, but not the cost to the government.

A second issue was the previously discussed issue about how store terminals could handle large negative files. The regionalization of negative files was not popular with retailers or FNS because it required single-lane retailers (whose POS terminals could not handle a statewide negative file) to phone for verification when recipients tried to shop outside their region. Despite these concerns, the final design includes the ability to implement regionalization, if needed.[5]

Finally, Citicorp EFS and ODJFS believed that some of FNS' and Booz•Allen's comments on the Detailed System Design Document were too oriented towards on-line EBT systems. They believed that off- and on-line EBT systems are sufficiently different that documentation requirements for the two types of systems should not have to be identical. This debate continued into efforts to test the system, as described later in this chapter.

3.4 System Development

As mentioned previously, the Citicorp EFS team was able to proceed with system development even while the design process was occurring. The major software development tasks were:

- programming the new PayFlex smart card to perform the transaction processing functions previously done in the POS terminal;

- writing software to create system files for use by FNS;[6]

- programming the new PayFlex card and the host computer to support the addition of host reference counters (HRCs); and

- programming the new PayFlex card and the host computer to support new security features, including a unique encryption key for each card and message authentication codes (MACs) for credit and debit transactions.

The introduction of unique card encryption keys and MACs added considerably to the complexity, and the security, of the system. The MAC incorporates a sequential host reference counter (HRC) to ensure that both the card and the host computer process the same sequence of credit transactions, by establishing a sequence number for each credit transaction. When the host stages a credit transaction

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5   ODJFS and Citicorp EFS decided to implement the system's regionalization feature in September 1998, when Cuyahoga County (Cleveland) began converting recipients to EBT. By this point the system's negative file had grown too large for the data to be stored in single-lane retailers' EBT terminals.

6   All EBT processors are required to submit state-level files to FNS each month that detail all transactions processed during the month. FNS uses these data to identify potential instances of food stamp trafficking.

to be downloaded to the cardholder's issuance sites, the sequence number is encrypted with other information in the MAC, using an encryption key unique to the card.[7] The card will not accept out-of-sequence credit transactions, and only the host and the card have both the HRC and the encryption algorithm and key used to calculate the MAC. The POS terminal permits the user to generate credit transactions, but any credit transaction must be processed by the host and a MAC generated before it can be posted to the card. These controls make it extremely difficult to add value to the card without establishing an auditable trail on the host system.

The integrity of debit transactions downloaded from the host (such as manual sales debits) is also protected by the use of MACs and HRCs. For each debit transaction initiated at the POS, a MAC is calculated using the card's encryption key and verified at the host to ensure that the transaction data have not been manipulated after authorization by the card. In a major change from the predecessor PayEase system, the Direction Card relies on the card rather than terminal to perform these secure message authentication functions.

The security features of the new system were documented in a key deliverable produced by the Citicorp EFS EBT team, the Direction Card Risk Analysis Plan. The risk analysis document discusses the potential security risks to the system and how each is addressed by the Direction Card system design. The risk analysis plan was submitted to ODJFS in February 1997.

Also included under system development activities were several tasks that the Citicorp EFS team performed as part of preparation for roll out, many of which took the whole duration of the design and development phase. These activities included:

- development of the Implementation Plan (described in Chapter 5);

- development of a process for distributing retailer agreements, collecting retailer signatures, and executing the agreements;

- development of a procedural approach to conducting site surveys;

- development of a technical and procedural approach to installing equipment;

- development of a technical and procedural approach to equipment maintenance;

- development of the inventory control and distribution system for hardware and cards;

- documenting these systems and approaches and training staff;

- development of the County Training Manual and the procedures documented therein; and

- development of the Retailer Training Manual and the procedures documented therein.

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7   The PayEase system used a sequential host reference number for the same purpose, but it was checked by the POS terminal and therefore less secure than the combination of HRC and MAC.

The Citicorp EFS team was undertaking the first state-wide rollout of an off-line EBT system, so it had to start "from scratch" in determining what needed to be done, how, and how quickly. For this reason, these system development efforts were quite labor-intensive. Particularly time-consuming were the development and documentation of all the technical and procedural approaches to support the installation and maintenance of equipment. In addition, the Citicorp EFS team prepared several iterations of both the County Training Manual and the Retailer Training Manual in response to changes suggested by ODJFS.

3.5   System Testing

Any new EBT system delivering food stamp benefits must be approved by FNS before it can be implemented. This approval process hinges on the system's "acceptance test," which is usually a multi-day event consisting of the following major components:

- An exercise of all system functions and allowable transactions, following a pre-arranged script, with subsequent review of the system's management reports to ensure that all transactions were correctly processed.

- A period of "what-if" testing, during which time test participants try a series of unscripted actions to make sure that the system correctly processes **any** attempted transaction or activity.

- A "stress test" of the system, to ensure that telecommunication links and processing flows can handle expected levels of system use under full implementation.

- A "live transaction" test, during which time limited food stamp benefits are posted to a small number of client accounts, EBT cards are issued to the clients, the clients use their cards in a few EBT-equipped stores to purchase groceries, and retailers' bank accounts are then reimbursed for the EBT sales.

FNS recommends, but does not require, that a "functional demonstration" should occur after basic development work has been completed and before the acceptance test. For the Direction Card system, FNS agreed to ODJFS' plan to omit the functional demonstration, because of the similarity between the pilot and new EBT systems and the need for an accelerated design and development schedule. FNS also agreed that the system's acceptance test could focus on the functional differences between the old and new systems.

Test Plans

Citicorp EFS, as the prime contractor to ODJFS for the expanded system, had ultimate responsibility for preparing the system's Acceptance Test Plan, and Citicorp EFS edited, formatted, and produced the final document. SVS, however, took the lead in proposing the testing strategy, developing the test scripts, and writing the majority of the document. The task of developing the test plan was made easier due to the fact that the Citicorp EFS team was able to use as a model an existing Acceptance Test Plan developed by SVS for the off-line EBT system in Wyoming.

The initial draft of the Acceptance Test Plan was submitted to FNS on October 18, 1996, approximately seven weeks before the scheduled start of the test. FNS responded with its comments a week later. FNS expressed concern over Citicorp EFS's request that all plans for what-if tests be submitted two weeks in advance of the test, noting that it is often during the testing period itself that evaluators identify new scenarios to be tested. FNS also requested additional test scenarios and scripts to cover system functionality not addressed in the draft plan. Several of the requests dealt with system security, an issue that became somewhat controversial during the testing period. After several iterations of revisions to the test plan and subsequent comments, the final Acceptance Test Plan was distributed to test participants at the beginning of the testing period.

> The Acceptance Test Plan shall include an acceptance test schedule, test procedures, and test data for evaluating the project. It shall include the methodology to be used to verify that the off-line EBT system operates in accordance with Food Stamp Program and RFP specifications. The document shall summarize all details necessary to operate the off-line system including system component configurations at each retailer.
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> [*] RFP, p. 66.

The effects of the compressed design and development period were clearly evident as the parties prepared for the December acceptance test. The test could not be delayed because transaction processing in Montgomery County had to be converted to the new system before January 1, 1997, the date when FNS' contract with SVS for pilot operations was set to expire. At the same time, however, Citicorp EFS did not have an approved Detailed System Design Document until November. The Citicorp EFS team was concerned about the lack of approval because any last-minute changes to system design would necessarily require a change to test plans.

Acceptance Test

The acceptance test of the Ohio EBT System took place at SVS' headquarters in Louisville, Kentucky, over a three-day period beginning December 9, 1996. Representatives from ODJFS, Citicorp EFS, SVS, CACI, FNS, and Booz•Allen were in attendance.[8] To test changes in the EBT card and transaction processing flows, POS terminals were set up to represent a variety of system locations, including a 12-lane retailer, several single-lane retailers, the Montgomery County Fiscal Control Office (FCO) Card Management System (CMS), the county's Assistance Control Office (ACO) Issuance Terminal, FNS, Customer Service, and the state CRIS-E Certification System.

Five "test teams," composed of three individuals per team, were selected to test various system functions. Over the three days of testing, participants followed specific test scripts and testing procedures established by the Citicorp EFS team. After system initialization and setup on the first

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8   Representatives from Abt Associates Inc. and Phoenix MAXIMUS were also in attendance.

day, each day generally began with a review of system reports on the previous day's activities. This was followed by scripted tests of changed functionality within the system and then what-if testing. Stress testing of the host capacity for large volumes of POS transactions was not done because off-line systems do not authorize each transaction at the host. Sizing for the host capacity for handling retailer batches, reconciliation, report generation, and state file transmissions was discussed. The host was sized to handle 66 percent of the total projected caseload, which was considered accept-able.[9] Live testing is usually done for several cases loaded with about $30.00 each. This demon-strates posting, debiting, and settlement operations. Live testing was considered unnecessary because of the extensive and on-going operations of the Dayton pilot and the lack of system changes in these functional areas.

With respect to the what-if testing, representatives from Booz•Allen had developed an extensive list of "what-if" test scenarios, many of which were hand-carried to the test. ODJFS and the Citicorp EFS team both reported that not having these test scenarios prior to the test posed a challenge because the Citicorp EFS team was not able to prepare the system in the necessary manner. Also, although the Citicorp EFS team had built time into the schedule for what-if testing, they had not expected the large number of tests that Booz•Allen requested. Nevertheless, all testing was completed within the three scheduled days.

One issue arose during the acceptance test relating to the security of the system. Booz•Allen and FNS requested that certain security tests of the system be performed, especially in light of the fact that many security-related details of the system did not appear in the Detailed System Design Docu-ment. In particular, Booz•Allen wanted more detailed information on communications protocols, the message authentication codes (MACs) used in the EBT cards and back-room PCs in multi-lane stores, and management of security keys.[10] The Citicorp EFS team and ODJFS believed that it was not necessary to provide such detailed information, especially because the pilot EBT system had experienced few security problems. SVS was concerned that, in order to respond fully to Booz•Allen's request for security testing and review, SVS would have to divulge proprietary business information. Rather than providing this information, the Citicorp EFS team proposed that Booz•Allen attempt to directly breach the security of the card and the back-room PC.[11]

In the end, Booz•Allen and SVS had extensive discussions about the security key management, MACing, and encryption techniques used for the PC and other elements of the system, and SVS was not required to provide code or documents revealing their proprietary data. Some tests were made to evaluate the robustness of the security measures, and these were determined to be sufficient.

In general, the acceptance test went quite well, with only nine deficiencies reported. Deficiencies that were identified during the test were reported on Acceptance Test Incident (ATI) reports and were assigned a priority of between 1 and 4 (with 1 being the most serious and 4 being the least

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9   There would be ample time to increase the capacity of the host, as needed, as the system was gradually rolled out throughout the state on a county-by-county basis, as described in Chapter 4.

10   Security keys are the tools used to manage encryption and de-encryption of protected data.

11   The back-room PC is used for data storage and communications with the host computer. It is configured without a monitor or keyboard.

serious). Five of the nine deficiencies were categorized as level 3 ("minor functional deficiency") and four were categorized as level 4 ("cosmetic deficiency"). All nine deficiencies were corrected during the three days of the test. A week after the test, Booz•Allen recommended approval of the system to FNS.

FNS formally approved the system on December 17, 1996. This approval was contingent upon the successful resolution of all ATIs and presentation of proof thereof (regression script and results) by the Citicorp EFS team, as well as making appropriate changes to resolve report discrepancies identified in the Booz•Allen report on the acceptance test. These resolutions and changes were accomplished to the satisfaction of Booz•Allen and FNS.

Chapter 4
Implementation of the Direction Card System

4.1   Introduction

The statewide implementation of the Direction Card system began in January 1997, when the Citicorp EFS team converted the existing accounts of Montgomery County recipients from the PayEase pilot system to the Direction Card system. The process ended over three years later, in February 2000, when the last recipients in Athens County were converted from food stamp coupon issuance to using the Direction Card. Between March 1997 and September 1999, the Citicorp EFS team equipped and trained the remaining 87 County Departments of Jobs and Family Services (CDJFS) and over 5000 retailers. The CDJFS, in turn, provided cards and training to over 255,000 recipients. The ODJFS project team oversaw this entire process and provided on-site consultation, training and trouble-shooting assistance to the CDJFS. ODJFS and the Citicorp EFS team established the overall schedule, but each CDJFS had its own schedule for recipient conversion within this framework.

Due to the extended period over which the statewide system was implemented, the evaluation split its examination of implementation activities into two phases—"early implementation" and "late implementation." The early implementation phase included all expansion activities through March 1998, a period of 15 months. During this period, ten counties in the southwestern part of the state began converting recipients to the Direction Card system. This period was documented through contacts with county administrators in all ten counties, and also with representatives of ODJFS and the EBT vendors. The findings of this stage of the evaluation have been presented in a previous report.[1] The late implementation phase, spanning from April 1998 through February 2000, was documented through a series of interviews with ODJFS and Citicorp EFS team members, and through in-person interviews shortly after implementation with administrators in five counties that converted during this phase. The five CDJFS included three of the state's largest counties (Cuyahoga, Franklin, and Lucas) and two small, largely rural counties (Auglaize and Morgan).

Implementing the Direction Card system throughout Ohio was a large and complex endeavor, but the state, vendor and county staff accomplished this goal through careful planning, effective management and hard work. This chapter describes the implementation process, including the following elements:

- The sequencing of system implementation within and among Ohio's 88 counties;

- Planning for system implementation by ODJFS, the Citicorp EFS team, and the CDJFS (also referred to in this chapter as "the counties");

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1   P. Elwood *et al.*, "Evaluation of the Expanded Off-line EBT System in Ohio: Moving to a Statewide EBT System Using Smart Cards for Food Stamps", Project Officer: J. Genser. U.S. Department of Agriculture, Food and Nutrition Service, Office of Analysis, Nutrition and Evaluation, Alexandria, VA, 1999.

- Conversion of authorized retailers to accept the Direction Card for FSP purchases and other program transactions;

- Conversion of CDJFS offices for their roles in Direction Card implementation and operations;

- Conversion of recipients from the food stamp coupon system to the Direction Card system; and

- Technical problems and improvements to the Direction Card system during implementation.

Each of these elements is the topic of a subsequent section of the chapter.

4.2   Sequencing of System Implementation

As noted, the Direction Card system began operations on January 1, 1997, when approximately 7,700 food stamp recipients using the PayEase system were converted to the new system. After a planned "shakedown" period of operating the new system with this caseload, the first step in expanding the system was to convert the remaining 7,500 food stamp recipients in Montgomery County to EBT. Before this expansion could begin, the Citicorp EFS team first had to equip all interested FSP-authorized retailers in the county with EBT terminals and train retailer staff in how to use the equipment. Thus, in March 1997, CACI began equipping retailers in Montgomery County outside the area served by the PayEase pilot. In August, the Montgomery CDJFS began converting food stamp recipients from food stamp coupon issuance to EBT issuance. These recipients began receiving benefits through the EBT system in September 1997. All food stamp recipients in Montgomery County were converted to EBT by January 1, 1998, five months after county expansion began.

In the other counties, which had no prior EBT experience, conversion activities followed a somewhat different pattern than in Montgomery County. Conversion began with a group meeting with program-authorized retailers in a county, followed by signed agreements between Citicorp EFS and the retailers, store surveys to determine equipment requirements, and equipment installation and retailer training. In a parallel set of activities, CACI installed EBT equipment in the county offices and trained county staff in EBT-related functions. ODJFS also provided EBT training for the county staff. On the date chosen by the CDJFS, county staff then began converting recipients to the Direction Card by issuing them EBT cards and providing EBT training.

The conversion of retailers, county offices and recipients to the Direction Card system proceeded sequentially in seven clusters of counties over the three years from the start of expansion in Montgomery County to the end of recipient conversion. In each cluster, the retailer conversion process for most counties started in the same month, although this process sometimes started one or two months earlier in the largest counties in the cluster. Overall, the retailer and county conversion process took about two years, from the first retailer recruitment outside Montgomery County to the last training for CDJFS staff. The start of the recipient conversion process in each cluster was staggered over two to nine months, depending on the number of counties and the pace of retailer conversion and county preparations. Exhibit 4-1 shows the location of these clusters and the number of counties in each cluster. The exhibit summarizes the timing of retailer and recipient conversion in each cluster.

Exhibit 4-1

Ohio County Clusters for EBT Implementation
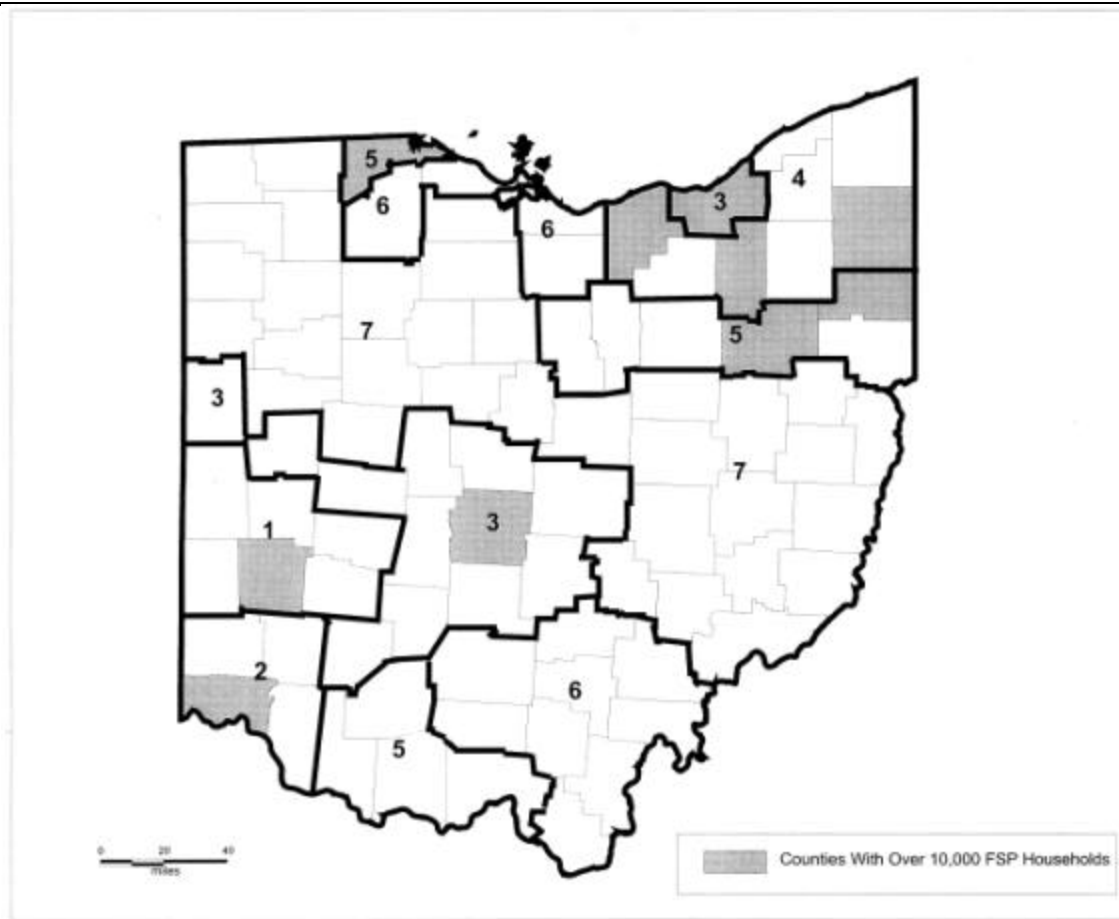
Cluster	Region	Number of Counties	Retailer Conversion Start	Recipient Conversion Start	Recipient Conversion End
1	Southwest	6	June 1997	August 1997 – November 1997	December 1997 – June 1998
2	Southwest	4	August 1997	January 1998 – April 1998	June 1998 – October 1998
3	Central and Northeast	13	February 1998 – March 1998	May 1998 – July 1998	July 1998 – March 1999
4	Northeast	8	July 1998	November 1998 – July 1999	March 1999 – December 1999
5	Northwest and South Central	11	December 1998 – February 1999	February 1999 – May 1999	June 1999 – January 2000
6	Northwest and South Central	13	April 1999	June 1999 – July 1999	August 1999 – February 2000
7	Northwest and Southeast	33	May 1999 – June 1999	July 1999 – September 1999	September 1999 – January 2000

As Exhibit 4-1 shows, the conversion process began with two clusters in the southwestern part of Ohio: Cluster 1, which included Montgomery County and five adjacent counties, and Cluster 2, which included Hamilton County (Cincinnati) and three adjacent counties. These two clusters comprised the counties where conversion began during the early implementation phase.[2] Cluster 3, where retailer conversion began in February 1998, included 13 counties in the central and west-central parts of Ohio, including Franklin County (Columbus) and its adjacent counties, with the addition of Cuyahoga County (Cleveland). Cluster 4 comprised eight counties in the northeastern corner of Ohio, including Summit County (Akron); retailer conversion in this cluster began in July 1998. Starting with the next group of counties to start conversion, Cluster 5, the vendor implementation staff was divided into two teams operating in separate areas. Retailer conversion began in December 1998 in this cluster, which included six counties in northeastern Ohio (including the cities of Canton and Youngstown) and four counties in south-central Ohio. Similarly, Cluster 6 included Lucas County (Toledo) and three other counties in northwestern Ohio plus nine counties with the south-central region, with retailer conversion in all thirteen counties starting in April 1999. The last cluster, Cluster 7, had retailer conversion beginning in May 1999 and included 33 counties spread over the eastern, central and northwestern regions of the state.

Exhibit 4-2 lists the counties in each cluster in order of their retailer and recipient conversion start dates. As the exhibit shows, the recipient conversion end dates varied considerably within clusters, even among counties where recipient conversion began at the same time. Some counties began recipient conversion in one month and completed in the next month; at the opposite extreme, the recipient conversion process sometimes took over seven months. The largest counties (those in bold print) tended to have long recipient conversion processes, but some of the smaller counties took just as long, for reasons discussed later in this chapter.

Exhibit 4-3 shows the trends in the statewide total number of active EBT cases and the total FSP caseload on a monthly basis, from January 1997 through February 2000. As the bottom line on the graph indicates, recipient conversion was relatively slow in 1997, accelerated during 1998 and early 1999, and then accelerated again in July 1999. The majority of households were converted in 1999, when the proportion of the FSP caseload participating via EBT grew from 35 percent to 94 percent. The exhibit also highlights the gradual but steady decline in the FSP caseload (the top line) from 386,985 in January 1997 to 255,176 in February 2000.[3]

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2   The first two clusters originally included fourteen counties, but four of these counties were shifted to the third cluster.

3   The FSP caseload data exclude the 21,000 SSI recipients in Cuyahoga County whose FSP benefits are added to their SSI checks. These recipients were not affected by the implementation of the Direction Card system. The FSP caseload in Ohio increased during 2001 and early 2002, rising to 324,323 by February 2002.

Exhibit 4-2
County EBT Implementation Dates by Cluster

Conver-sion Cluster	County	Retailer Recrui-tment Began	Recipient Conversion Began	Recipient Conversion Completed	Months of Recipient Conversion
1	**Montgomery**	March 1997	August 1997	January 1998	5
	Preble	June 1997	September 1997	December 1997	3
	Greene	June 1997	September 1997	March 1998	6
	Miami	June 1997	October 1997	February 1998	4
	Clark	June 1997	October 1997	April 1998	6
	Darke	June 1997	November 1997	June 1998	7
2	Butler	August 1997	January 1998	June 1998	5
	Hamilton	August 1997	January 1998	October 1998	9
	Warren	August 1997	March 1998	June 1998	3
	Clermont	August 1997	April 1998	July 1998	3
3	**Cuyahoga**	February 1998	July 1998	March 1999	8
	Shelby	March 1998	May 1998	July 1998	2
	Clinton	March 1998	June 1998	July 1998	1
	Mercer	March 1998	June 1998	July 1998	1
	Champaign	March 1998	June 1998	August 1998	2
	Delaware	March 1998	June 1998	October 1998	4
	Licking	March 1998	June 1998	October 1998	4
	Fairfield	March 1998	June 1998	November 1998	5
	Pickaway	March 1998	June 1998	November 1998	5
	Madison	March 1998	July 1998	September 1998	2
	Union	March 1998	July 1998	September 1998	2
	Fayette	March 1998	July 1998	October 1998	3
	Franklin	March 1998	July 1998	March 1999	8
4	Medina	July 1998	November 1998	April 1999	5
	Lorain	July 1998	November 1998	May 1999	6
	Summit	July 1998	November 1998	August 1999	9
	Portage	July 1998	January 1999	March 1999	2
	Ashtabula	July 1998	January 1999	July 1999	6
	Trumbull	July 1998	January 1999	July 1999	6
	Lake	July 1998	May 1999	December 1999	7
	Geauga	July 1998	July 1999	August 1999	1
5	Mahoning	December 1998	February 1999	July 1999	5
	Stark	January 1999	February 1999	September 1999	7
	Wayne	February 1999	March 1999	August 1999	5
	Columbiana	February 1999	March 1999	November 1999	8
	Adams	February 1999	April 1999	July 1999	3
	Scioto	February 1999	April 1999	September 1999	5
	Richland	February 1999	April 1999	October 1999	6
	Ashland	February 1999	May 1999	June 1999	1
	Brown	February 1999	May 1999	June 1999	1
	Highland	February 1999	May 1999	June 1999	1
	Lucas	February 1999	May 1999	January 2000	8
6	Erie	April 1999	June 1999	October 1999	4
	Jackson	April 1999	June 1999	October 1999	4
	Pike	April 1999	June 1999	October 1999	4

Exhibit 4-2
**County EBT Implementation Dates by Cluster**

Conver-sion Cluster	County	Retailer Recrui-tment Began	Recipient Conversion Began	Recipient Conversion Completed	Months of Recipient Conversion
	Lawrence	April 1999	June 1999	December 1999	6
	Hocking	April 1999	July 1999	August 1999	1
	Wood	April 1999	July 1999	August 1999	1
	Huron	April 1999	July 1999	September 1999	2
	Meigs	April 1999	July 1999	September 1999	2
	Ottawa	April 1999	July 1999	September 1999	2
	Ross	April 1999	July 1999	September 1999	2
	Vinton	April 1999	July 1999	September 1999	2
	Gallia	April 1999	July 1999	December 1999	5
	Athens	April 1999	July 1999	February 2000	7
7	Perry	May 1999	July 1999	September 1999	2
	Crawford	June 1999	July 1999	September 1999	2
	Hancock	June 1999	July 1999	September 1999	2
	Holmes	June 1999	July 1999	November 1999	4
	Seneca	June 1999	July 1999	November 1999	4
	Muskingum	June 1999	July 1999	December 1999	5
	Morrow	June 1999	July 1999	January 2000	6
	Knox	June 1999	August 1999	September 1999	1
	Logan	June 1999	August 1999	September 1999	1
	Auglaize	June 1999	August 1999	October 1999	2
	Marion	June 1999	August 1999	October 1999	2
	Guernsey	June 1999	August 1999	November 1999	3
	Hardin	June 1999	August 1999	November 1999	3
	Morgan	June 1999	August 1999	November 1999	3
	Sandusky	June 1999	August 1999	November 1999	3
	Allen	June 1999	August 1999	December 1999	4
	Carroll	June 1999	August 1999	December 1999	4
	Coshocton	June 1999	August 1999	December 1999	4
	Harrison	June 1999	August 1999	December 1999	4
	Tuscarawas	June 1999	August 1999	December 1999	4
	Belmont	June 1999	August 1999	January 2000	5
	Fulton	June 1999	September 1999	October 1999	1
	Henry	June 1999	September 1999	October 1999	1
	Monroe	June 1999	September 1999	October 1999	1
	Putnam	June 1999	September 1999	October 1999	1
	Van Wert	June 1999	September 1999	October 1999	1
	Defiance	June 1999	September 1999	November 1999	2
	Paulding	June 1999	September 1999	November 1999	2
	Wyandot	June 1999	September 1999	November 1999	2
	Jefferson	June 1999	September 1999	December 1999	3
	Noble	June 1999	September 1999	December 1999	3
	Washington	June 1999	September 1999	December 1999	3
	Williams	June 1999	September 1999	December 1999	3

Counties Listed in Bold Type Had Over 10,000 Food Stamp Households as of October 1999.

Note: Estimated months for conversion based on assumption of start and end at mid-month.

Exhibit 4-3

Ohio Total Food Stamp Caseload and EBT Caseload, January 1997 to June 2000
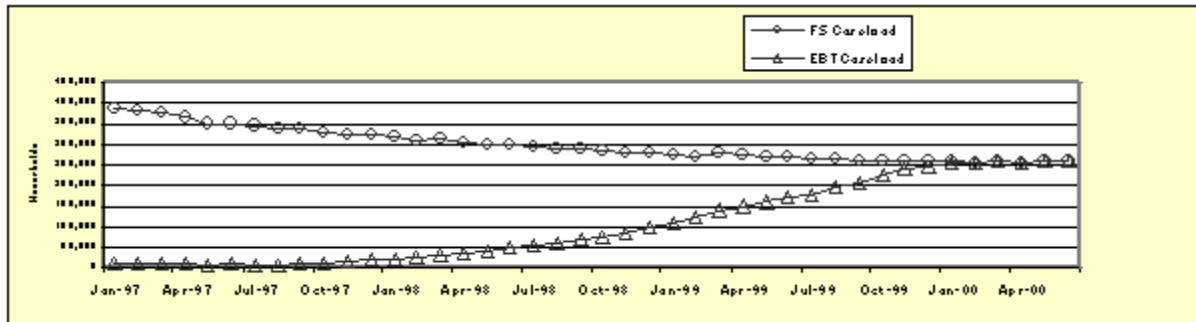
4.3   Implementation Plan

Much of the planning required to implement the Direction Card system was in place before statewide expansion began. For instance, many of the planning documents prepared during the Dayton pilot were revised for statewide implementation. In addition, a detailed Implementation Plan was prepared during the design and development phase. The Implementation Plan outlined major tasks associated with statewide expansion of off-line EBT and specified the dates on which the tasks were to occur.

The Implementation Plan called for clusters of counties to be converted to EBT at about the same time. Most clusters included a major metropolitan area and several surrounding counties. (The clusters in the Implementation Plan were somewhat different from the actual clusters of conversion activity.) This clustering approach allowed the Citicorp EFS team to focus its conversion efforts in one or two geographic areas at a time. In determining when counties would be converted to off-line EBT, the Citicorp EFS team took two main factors into account. First, the team was interested in getting as many counties converted as quickly as possible. Second, the team wanted to gain experience in smaller counties before beginning conversion in the largest counties—Hamilton, which contains Cincinnati, and Cuyahoga, which contains Cleveland.

The Implementation Plan outlined the main tasks and time frames associated with implementing off-line EBT in each county. The retailer conversion activities identified in the Implementation Plan included the following:

- presenting off-line EBT at retailer meetings in each metropolitan area;
- mailing information packets to retailers;
- obtaining signed agreements from retailers;
- establishing retailer accounts on the EBT system;
- wiring stores;
- installing equipment; and
- training retailers.

The county office conversion activities identified in the Implementation Plan included:

- mailing letters to EBT coordinators in each county;
- completing site visits;
- setting up accounts for counties;
- installing equipment; and
- training county staff.

Although the Implementation Plan outlined the main tasks and time frames, it was necessary for the Citicorp EFS team to specify further its plans for working with each county and each retailer. For example, although the date that each county was to be trained and equipped was projected in the Implementation Plan, the actual dates were left to the discretion of the counties, within specified ranges. CACI took the lead on the time-consuming task of establishing dates to equip counties and train county staff. This task was especially time-consuming when county staff changed their minds about when they wanted to be equipped, where they wanted equipment placed, and when they wanted to be trained.

Additional planning took place early during the implementation phase. This planning included continual meetings with the Ohio Grocers Association (OGA), Kroger's (the largest food retail chain in the state of Ohio), community organizations, and selected counties. It also included revising several existing planning documents, and revising the tasks and timeframes associated with converting retailers and county offices.

During the early implementation phase, ODJFS and the Citicorp EFS team continued to plan and meet with the OGA. Meetings between Citicorp EFS and the OGA were held as needed during early implementation. On average, meetings were held once every four to six weeks. Sometimes, however, two or three months passed between meetings.

There was one major issue that arose during the discussions between ODJFS, the Citicorp EFS team and the OGA. The OGA wanted ODJFS and the Citicorp EFS team to equip 100 percent of grocers' lanes with off-line EBT equipment, not just the lanes covered under the formula in FSP regulations. Citicorp EFS was willing to do so if the necessary funding was provided. ODJFS was concerned that the costs of additional terminals would not be eligible for FNS reimbursement. A compromise solution was reached prior to rollout. This compromise solution involved using a modified formula to determine how many lanes were to be equipped.[4] ODJFS initially provided funding for approximately 1,800 extra POS terminals (beyond what Citicorp EFS was required to provide under its contract) and associated equipment, installation, maintenance, and supplies. ODJFS later funded 300 more terminals to meet its commitment under the modified formula. Thus, ODJFS was financially responsible for 21 percent of the approximate total of 10,000 POS terminals deployed statewide for the Direction Card system.

Although ODJFS had been quite involved in the more general planning that took place during the design and development phase, ODJFS was less involved in the detailed planning by the vendor team during the

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4   For stores redeeming less than $1,000 in FSP benefits each month, one free EBT terminal would be provided. Two lanes would be equipped for free if the store redeemed between $1,000 and $6,000 in FSP benefits each month. For stores redeeming more than $6,000 in benefits per month, the percentage of lanes to be equipped would be either 50 percent or the percent required by EBT regulation, whichever was higher. In the majority of cases, 50 percent of grocers' lanes were equipped.

early implementation phase. ODJFS staff, however, assisted the Citicorp EFS team in preparing planning documents, attended planning meetings, and collaborated with the Citicorp EFS team in day-to-day problem-solving activities.

4.4   Retailer Conversion

Within the Citicorp EFS team, CACI had responsibility for converting retailers to the Direction Card system. CACI's team included a project manager, a marketing coordinator, several systems engineers, a database manager, a warehouse team, four retailer trainers, three customer service representatives, three maintenance supervisors, a group of electricians, and a network of maintenance technicians. Most of the retailer equipment installations were done by the electricians. The CACI systems engineers also participated in the installations. As retailer conversion neared completion in each area, CACI hired maintenance staff and assigned these staff to perform installations, first as a learning tool and later to follow up with retailers that were not equipped by the primary installation teams.

As discussed in the next section, CACI also handled conversion of CDJFS offices. Retailer conversion activities always began prior to county conversion activities, because of the time needed to equip all program-authorized retailers within a county. In small counties, preparations for conversion in retail locations and county offices sometimes occurred simultaneously.

As part of its effort to prepare retailers for EBT, the Citicorp EFS team prepared an introduction package that included a letter and a brochure explaining the new Direction Card system. Using lists provided by FNS, CACI mailed out these packages to all retailers in stages, according to the implementation schedule. The Citicorp EFS team also held a series of meetings to inform retailers about off-line EBT. One meeting was held in each cluster of counties. During these meetings, representatives of Citicorp EFS, CACI and ODJFS gave presentations about the new system and answered retailers' questions. The presentations highlighted the advantages of EBT and explained the upcoming implementation process. Retailers were informed about the important choices that they would be asked regarding how to settle, whether to accept manually authorized purchases, and how they would be trained. CDJFS managers and FNS Field Office staff also attended some of these meetings to learn more about the plans for implementation of the Direction Card (in addition to the formal implementation plan already available to them).

At these meetings, retailers raised a number of concerns and questions. In addition to the terminal deployment issue previously discussed, these concerns included having to use separate equipment for EBT, merchants' liability for manual transactions, and how the system would accommodate route vendors. Most of the attendees at these meetings were small retailers, so their concerns were the main focus. In cases where issues raised at retailer meetings were not fully resolved during the meeting, ODJFS and the Citicorp EFS team worked with the retailers to resolve the issues successfully.

When the initial meeting with retailers in a cluster of counties had been completed, CACI sent an information packet with a retailer agreement form to all FNS-authorized retailers. The agreement form represented the basic contract between the retailer and Citicorp EFS to provide EBT services. Retailers were asked to fill out the agreement completely, sign it, and return it to CACI. With a signed agreement in hand, the Citicorp EFS team would establish an account for the retailer on the EBT host and initiate efforts to equip and train the retailer.

This approach did not work particularly well, because retailers were often slow to return signed agreements due to confusion, inattention, or other factors. Responding to feedback from retailers, the Citicorp EFS team decided to take a new approach to securing signed retailer agreements. First, as before, CACI mailed out the information packets. This mailing was then followed with a telephone call, during which time CACI staff asked questions about the retailers' sites and provided retailers with additional information about off-line EBT. These conversations allowed CACI to collect vital information (including store hours and location) and address the concerns of reluctant retailers. CACI determined the retailers' preferences on options regarding settlement, manual authorizations, and staff training. At the end of the telephone calls, CACI had all the information it needed to complete the retailer agreements and send them out for signature. When retailers began receiving follow-up phone calls and retailer agreements that were filled out in advance, they were much quicker to sign the contracts and send them back to Citicorp EFS. A small proportion of retailers were still slow to return their agreements even under this system, and these retailers were sometimes equipped long after their local peers as a result. If a letter to a retailer was returned, or a change of ownership was identified, CACI notified the local FNS office, so that FNS could take the necessary action to update its records or withdraw the retailer's authorization.

For large, chain-owned supermarkets, the marketing process followed a different sequence. The Citicorp EFS team met separately with the regional management of the major supermarket chains to discuss the implementation plans and to work out protocols for establishing agreements, installing equipment and training staff. Some of these chains had two or more operational regions in Ohio, and coordination with each regional management office was needed. The Citicorp EFS team established a master agreement with each chain and then added stores to these agreements as the implementation process proceeded. Some decisions were made at the corporate level, such as how and when settlement would occur, and whether manual transactions would be processed. The store-level information in the agreements included the number of lanes to be equipped, as well as information needed to schedule installations and to set up settlement arrangements. To plan for equipment installation and staff training in the large supermarkets, CACI conducted site visits to nearly all of these stores, took photographs and made sketches of the layouts, and consulted with the chains' technical personnel and store managers.

The determination of the number of lanes to be equipped in each store was an important part of the planning for retailer conversion, particularly for the multi-lane stores. CACI used a computerized report from FNS to determine the number of terminals to which each store was entitled under the FNS formula. (CACI obtained regular updates to this report, so that the information was kept current.) ODJFS reviewed this information, determined if any additional terminals should be provided according to its formula, and provided the final count to the Citicorp EFS team.

Retailer installation was relatively straightforward after planning and preparation activities were completed. After retailers returned signed agreements, CACI notified SVS that the retailers had met the requirements to use the Direction Card system. SVS then established an EBT account on the host system for each retailer, using the information obtained by CACI from FNS and the retailer. CACI determined the equipment and installation supplies to be sent to each retailer, tested the equipment, recorded the items in a database, and shipped the items to the retailers using a traceable delivery service. The shipments were timed to arrive shortly before installation was scheduled in the retailer's area, and they were clearly identified as Ohio Direction Card equipment. Each shipment was accompanied by an itemized list to be signed at the time of installation by the retailer.

Based on the implementation plan and the progress in obtaining retailer agreements, CACI scheduled its installation crews to work in each county or group of counties over a specified period. Initially, this activity was concentrated on one or two of the county clusters at a time, but the teams became more numerous and dispersed as the number of counties in conversion reached their peak (between November 1998 and June 1999). CACI advised each retailer to expect installers within a certain range of days, although this schedule was adjusted when possible to accommodate busy shopping periods or other constraints. CACI crews encountered a few situations where retailers would not allow them to proceed as planned with installations, but the great majority of retailers wanted to make sure they were ready when recipient conversion started. In a few cases, installations could not be done when the installation crews were in the area, so these installations were done later by the CACI maintenance technicians. On a few occasions, CACI installers had reason to question whether a store should be equipped, so they consulted with the FNS field office before proceeding.

Each retailer was responsible for providing electrical service at each checkout lane and a telephone line for settlement. Multi-lane retailers also had to provide suitable access for placing the PC controlling the local area network (LAN) of terminals and wiring the LAN. These requirements were seldom problematic, even in rural and inner-city areas. Finding a suitable location for the PC was sometimes a challenge, because it needed to be reasonably secure yet accessible for wiring and repair, and it needed a stable power supply. If a store was under construction or renovation, installation was scheduled if possible during this process, because access for wiring and mounting equipment would be easier. Particularly for multi-lane installations, the crews had to be prepared to modify the installation plan to fit the current requirements. In a few instances, retailers had to bear the cost of bringing their facilities up to construction standards so that the installation could proceed. Retailers that chose to remodel their stores or move EBT equipment after the initial installation were similarly responsible for these costs.

When installation in each store was complete, the technicians notified CACI headquarters, and a CACI trainer set up a training appointment. Like the installers, the trainers scheduled their work in geographic clusters. The vast majority of training was provided in the checkout lanes, but some retailers chose to have training in a group setting in the store, and one chain had CACI train the chain's trainers. The proportion of staff trained varied considerably; some retailers chose to train so few staff that they later needed to request followup training. The Direction Card software was loaded at the time of the training visit; this timing prevented premature use or misuse of the equipment.

The trainers helped retailer staff learn how to use EBT equipment properly and provided a manual with operating instructions. They also provided training on settlement, reconciliation, and special manager procedures to the appropriate personnel. Training visits lasted from one and one-half hours (for single-lane stores) to an entire day. The CACI training staff included a Spanish-speaker and an Arabic-speaker, providing coverage for the two main alternate languages in Ohio. If needed, the trainers enlisted employees or owners' relatives to translate for owners with limited English proficiency. Each retailer acknowledged receipt of training in writing, and CACI checked this documentation if a retailer later complained about not being trained.

CACI developed special procedures to equip and train authorized retailers that did not have conventional stores, including mobile vendors, farmers' markets, drug or alcohol treatment programs, buying cooperatives, and meal services. Mobile vendors were provided portable POS terminals with battery packs, enabling them to process transactions at the point of sale and connect to a telephone line later for settle-

ment. These vendors received their equipment at the time of training. Single-lane retailers that offered delivery were required to choose either a portable terminal or a conventional installation. In one city, several vendors at a farmers' market had to be equipped with the portable POS terminals, because they did not have telephone or electrical service. Drug or alcohol treatment programs authorized as retailers by FNS were equipped with POS terminals, but they had to develop their own systems for tracking charges to recipients and food purchases. Buying cooperatives and meal services for senior citizens frequently sought equipment for all of their sites. Like all retailers, these organizations were entitled to one terminal per FNS authorization number, and these terminals were provided upon request. Most of the senior meal programs that received POS terminals later stopped accepting voluntary payment of food stamp benefits from their customers. According to ODJFS, these organizations did not think that the small volume of Direction Card payments was worth the effort to keep and use the POS terminals.

In each county, Citicorp EFS had to confirm that 85 percent of the retailers with signed agreements were equipped and trained before ODJFS would authorize the start of recipient conversion. The last counties reached this point in mid-August of 1999, only two weeks after the targeted completion date. CACI concluded retailer conversion activities in the late fall of 1999, following up on the retailers that had not signed agreements or made their stores available for installation during the scheduled period. During this period, the CACI maintenance staff assumed responsibility for all retailer installations and training, including services for newly authorized retailers.

Authorized retailers in border areas of adjacent states began seeking Direction Card equipment in late 1998, but no out-of-state retailers were equipped until after the statewide conversion was complete. The CDJFS in border counties conducted surveys during recipient conversion to identify out-of-state retailers where at least one percent of recipients shopped. If a retailer met this criterion, ODJFS authorized Citicorp EFS to provide one free terminal. The Citicorp EFS team worked out procedures with FNS to obtain authorization information on these retailers via the FNS REDE system, in order to set up and maintain their accounts.

Retailer Service During Implementation

As implementation progressed, operational support to the converted retailers became increasingly important to the Citicorp EFS team. Key retailer service activities included operation of the customer service hotline, equipment troubleshooting and maintenance in the field, responding to changes in FNS retailer authorization, and addressing technical problems.

The customer service hotline experienced "growing pains" during the early implementation period, and SVS took several steps to improve the level of service. Retailer concerns included complaints about the length of time needed to reach an operator, being provided inadequate information, and other deficiencies in service. In late 1998, SVS separated the customer service operation into two staffs and routed retailer calls (and calls from the county offices) to a specially trained Ohio EBT support team. (Recipient calls were assigned to a team of generalist customer service representatives, who also received additional training.) SVS also enhanced the management of the customer service operation and shifted the hours of supervisory staff to better conform with operating schedules in Ohio. Citicorp EFS approved these steps, and ODJFS viewed them as very successful at improving retailer service.

The level of service for retailer equipment troubleshooting and repair was quite good during implementation, according to Citicorp EFS and ODJFS. A key factor was CACI's use of separate teams for installation and maintenance, allowing each team to focus on one job. A small number of retailers complained to ODJFS about the timeliness of CACI service, and ODJFS always investigated through inquiries to Citicorp EFS. Most often, ODJFS found that the merchant had been slow to report the problem or was not available within the three-hour period when CACI was required to respond (e.g., a problem was reported when the store was closing, or the store did not open as scheduled). Some complaints about CACI's service arose because retailers expected a higher level of service than the response time established in the retailer contract.

On occasion, retailers called the local county office for help, either out of confusion or seeking intervention on their behalf. A common source of these calls was the errors made by retailers when transactions were not completed properly because the recipient pulled the EBT card out of the terminal too soon. The POS terminal was programmed to print a "void" or "suspect" message on the receipt if this happened, so that the cashier would know to check the card balance and reprocess the transaction if necessary. If the cashier failed to detect the error and the customer left the store, the retailer would not get credit for the sale. Retailers were trained to contact SVS customer service if they needed assistance, but they sometimes asked the county to contact the recipient so that the transaction could be repeated. A few counties contacted recipients and asked them to return to the store to pay for the food they obtained. On other occasions, the county office contacted SVS on behalf of retailers. ODJFS made it clear that counties should refer all retailer calls to SVS, and that they should not intervene when retailers had failed to follow proper procedures.

CACI provided additional training to a number of retailers after conversion. In some cases, the retailer asked for training, often because not enough staff had been trained or those who were trained had left. In a few instances, CACI undertook initial training after numerous recipients had complained of inadequate training of clerks. Nearly everywhere, retailers began using the Direction Card system soon after they were trained, but there were isolated instances where a lag in county implementation left the retailers in need of refresher training when recipients began using their cards.

During the early implementation period, the Citicorp EFS team found that the retailers requested POS equipment service more frequently than expected. One source of failures was a flaw in the application software that caused the software to become inoperative and require reloading. This problem was corrected with revised software that was downloaded to the installed terminals. In other cases, repeated failures led technicians to identify problems in the operating environment in specific stores, including power surges, competition for the telephone line during settlement, and a lack of ventilation for the controller PC. User errors, such as merchants unplugging equipment, were another source of trouble calls. The Citicorp EFS team worked to educate merchants about how to prevent problems and how to perform simple corrective measures, such as restarting the controller PC. Some merchants were reluctant or unwilling to take any steps to resolve equipment problems, despite the inconvenience of waiting for service.

Retailers encountered some communications problems affecting the settlement process during the early and middle phases of implementation, from the fall of 1998 into the spring of 1999. After the Citicorp EFS team switched vendors for the dial-up network used for settlement, retailers experienced difficulties connecting with the network. In November and December 1998, there were two days when no merchants

were able to settle. (The county offices were also affected.) This problem not only delayed payment, but it also resulted in some retailers' terminals locking up, because of the system feature designed to ensure regular settlement. In this situation, retailers were able to obtain an override code from customer service to unlock their terminals. The Citicorp EFS team raised the service quality issues with the network provider and obtained some improvements, but in the spring of 1999 they switched back to the previous vendor.

Retailers also found occasionally that their settlements were processed properly by their POS equipment, but they were not correctly processed by the host computer. Most often, this happened when a batch of transactions was transmitted successfully, but the front-end processor failed and the data were lost. In these situations, retailers could supply their POS printer tapes to have the transactions restored, so they were eventually reimbursed for their sales. SVS made some modifications to the host system to deal with these problems.

The Citicorp EFS team encountered several challenges as it developed routines for coordinating with FNS on retailer authorizations, withdrawals and disqualifications. Early in the implementation process, there were some minor problems with the timeliness and accuracy of updates to the retailer database. Most often, it appeared that unauthorized retailers were redeeming benefits, but in fact SVS had incorrectly entered authorization numbers for approved retailers into the EBT system.[5] CACI obtained daily retailer updates from the REDE system and updated its retailer database electronically, but SVS used a manual process to add retailer data to the EBT host. In response to FNS concerns, both CACI and SVS made the accuracy of FNS authorization numbers a higher priority.

The Citicorp EFS team and FNS also spent some time working out procedures for handling changes of ownership, particularly when equipment should be removed and when it should be left in the store. CACI found that retailer turnover created both a substantial workload and a logistical challenge. The challenge was to ensure that equipment was removed promptly when program integrity issues were at stake, but not too promptly in cases of routine changes of ownership, while protecting Citicorp EFS's investment in the equipment.[6]

One ongoing challenge was the time pressure involved with equipping large new stores, particularly supermarkets opened by major chains. The retailers wanted their EBT equipment in place before they opened, but the Citicorp EFS team could not activate a store before it completed the FNS authorization process, which could not begin more than 30 days before the store was scheduled to open. FNS provided advance notice to the Citicorp EFS team of pending applications for large stores. The Citicorp EFS team coordinated directly with the corporate management while the FNS authorization process was under way to facilitate the establishment of the agreement, equipment installation, and staff training. CACI frequently had a very narrow window of time to install the equipment, but they were always successful at completing the process in time for store openings.

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5   None of these situations involved unauthorized redemptions that had to be charged back to Citicorp EFS.

6   When a retailer is withdrawn from the FSP because of a change of ownership, SVS removes the retailer number from the list of authorized stores, blocking further transactions. A new owner cannot use equipment left in the store until FNS provides an authorization number to CACI and the retailer signs an EBT participation agreement with Citicorp EFS. Only after these steps are taken does SVS allow the equipment to upload transactions to be processed under the new authorization number.

4.5   County Conversion

Preparing county offices for EBT was an important task in the implementation of the Ohio Direction Card system. An significant factor was ODJFS' decision to have the county offices provide card issuance and hands-on training to all recipients during and after the conversion. This choice meant that the county offices had to be prepared for a more substantial role in recipient conversion than in many states, where contractors have done much of this work, either by mail or through locally-based mass training sessions. In other states, Citicorp EFS was usually able to send EBT information packets to a central office, but because Ohio is a county-administered state, the Citicorp EFS team dealt with each county individually. CACI worked closely with the individual EBT coordinators in each county to plan the details of preparation for off-line EBT.

CACI adapted its schedule for county conversion to the needs and capabilities of individual counties to prepare their staff and facilities for conversion.   Most county offices were equipped and trained around the time scheduled in the implementation plan, but these activities had to be delayed in several counties because of reorganizations, relocation of facilities, or other factors.

Preparations for County Conversion

As part of its effort to prepare counties for conversion to off-line EBT, ODJFS and Citicorp EFS developed and distributed an introduction packet that introduced counties to off-line EBT. This packet contained a letter and a short informational brochure. After sending the packets, CACI staff contacted the county office director or designated liaison by phone. During these phone calls, CACI gathered some basic information, and also answered some of the counties' questions about off-line EBT. During this phone call CACI staff also set a date for a site visit to each county. The date for this meeting was usually set 90 to 120 days before ODJFS' target date for the start of recipient conversion.

At each site visit, CACI made a one-hour presentation, showed a video describing the Direction Card system, and gave a demonstration of the off-line EBT equipment. A Citicorp EFS representative often participated in the site visit, particularly in the larger counties. The ODJFS EBT project director or the Assistant Deputy Director of Management of Information Systems (MIS) for ODJFS attended these meetings to discuss the plans for implementation and to answer questions about the interface between the EBT and CRIS-E systems. The ODJFS representative offered guidance and encouraged the county management to follow the schedule laid out in the implementation plan, but the county management was given the choice of when to start conversion and how rapidly to proceed.

One critical topic of discussion during the initial county site visits (and afterwards) was where training and card issuance would occur. CACI and ODJFS examined the counties' facilities and provided advice, but this was the county's decision. The county needed to take into account the space required, especially waiting and training areas, and the need for a smooth and controlled flow of recipient traffic, both for implementation and for ongoing operations. An important constraint was the need to conduct all conversion activities in the same facility, to ensure that recipients completed all steps in the process. In the vast majority of counties, there was only one office, and that office frequently had very limited space for waiting areas and group training, a factor that sometimes constrained the pace of conversion. Use of an off-site facility was not feasible because of the cost of obtaining and preparing space, and because of the

need for access to the state's recipient information system, known as CRIS-E, for the check-in process and card issuance.

The largest counties had multiple offices, so they had several possible locations for conversion. These counties considered several factors in deciding on the conversion site (or sites), including the availability of suitable space, the way that conversion would fit into agency operations, accommodations for disabled recipients, and availability of parking and public transportation. In some of the largest counties, food stamp issuance centers were available for use as EBT conversion sites. These sites had the advantage of being set up to handle large numbers of recipients. On the other hand, these sites had to stop issuing food stamps so that they could be full-time EBT conversion centers, or else they could only be used for conversion during the part of the month when there were no recurring food stamp issuances. In two counties, the lack of adequate available space or the necessary CRIS-E connections precluded the use of the facilities that would have been most convenient for recipients.

Based on the fundamental decision of where to conduct conversion activities, and on the assessment of county facilities, CACI and the county management jointly determined where off-line EBT equipment would be placed, with input from ODJFS. CACI then worked with the county to assess the requirements for equipment installation. In some cases, CACI staff discovered that little work was required to install off-line EBT equipment; in other cases, it was necessary to cut through floors to access the needed electrical and phone lines.

After site visits, the Citicorp EFS team ordered the equipment needed to convert county offices to off-line EBT. This equipment included computers, modems, and POS terminals. Each county office was provided one or more CMS personal computers for use by county staff to issue Direction Cards and perform other off-line EBT functions. The CMS computers allowed the counties to communicate with both SVS' system host computer and ODJFS' data network through use of modems and terminal emulation adapter cards. The largest counties (with 10,000 FSP households or more) were also provided with Customer Service Terminals (CSTs). These terminals allowed counties to obtain authorization codes from SVS' main off-line EBT processing computer. The authorization codes were required for EBT card replacement and certain other functions. The CSTs were also useful for checking recipients' accounts on the EBT host against the information on the card and the CRIS-E system.

Each county had a number of tasks to accomplish before the installation of EBT equipment and the training of staff. The county identified an EBT coordinator to lead local efforts and to serve as the primary contact on implementation issues with ODJFS and CACI. The EBT coordinator and other county managers formulated schedules for staff training, recipient notification, and conversion activities, within the overall framework of the plans established by ODJFS. The county implementation plans also addressed processes and systems for notifying and scheduling recipients for conversion, tracking completion of conversion, and follow-up for recipients who failed to attend scheduled training. Lastly, the county had to determine how to staff the conversion process and subsequent recipient services.

To aid this planning process, most counties visited similar counties that were in the process of recipient conversion to observe and gather information, a step strongly encouraged by ODJFS. There was an extensive amount of information exchange among the counties throughout the expansion process.

The ODJFS EBT staff provided advice to the counties, but ODJFS did not attempt to provide detailed direction. ODJFS had three full-time staff available to oversee the entire project, so the staff had a limited amount of time to support county planning, particularly given the number of counties and the other activities required during the same period.

A fundamental decision in each county was the target date for the completion of recipient conversion. For counties that had contracts for food stamp coupon issuance, the expiration dates of these contracts sometimes emerged as "drop-dead" dates to complete conversion. If the county agreed to accelerate conversion, thereby accelerating the flow of case management fees, Citicorp EFS offered to loan the county extra CMS computers to facilitate the process. Nearly all counties took advantage of this offer, because they would benefit from rapid conversion by eliminating the coupon issuance process. A few counties did not have enough staff available to undertake an accelerated conversion. If the conversion period included the summer, the local agency had to plan for periods when fewer staff were on hand because of vacations.

In planning which groups of participants would be converted when, the counties took into account the expected pace of conversion and the issues and constraints posed by the local operating environment. One issue common to most counties was when to convert recipients who might need extra help, such as senior citizens, those with disabilities, and group home residents. Some counties chose to convert these groups first, before the pace of conversion accelerated; others chose to convert them last, when training staff would be more experienced and difficulties would not delay the rest of the caseload. In the larger counties, the scheduling of participants had to take into account how the caseload was divided among offices and teams of workers, because of the need to coordinate EBT conversion and case management activities.

Making appropriate staffing changes was one of the more important activities associated with county preparation for off-line EBT. Guidance regarding staffing changes was provided by ODJFS and the Citicorp EFS team in the form of suggested staff positions for off-line EBT. These staff suggestions were developed well before implementation and were based in large part on existing ODJFS policy. The recommended organization included the following EBT staff roles:

- Fiscal Control Office (FCO) worker—responsible for card issuance and terminal-based transactions that update Direction Cards and the EBT computer.

- Assistance Control Office (ACO) worker—responsible for assisting clients in addressing issues by diagnosing problems presented by recipients, accessing or updating information on CRIS-E, preparing appropriate approval forms, and contacting SVS when necessary.

- Card Inventory Manager—responsible for managing the card inventory.

- Trainer—responsible for training clients.

- Supervisor—responsible for overseeing the work of the ACO, FCO, Card Inventory Manager, and Trainer.

The system design and ODJFS policy called for the separation of duties among certain positions, particularly between the FCO, ACO and caseworker functions. The key concern was ensuring that a worker would not have access to both authorization functions (on CRIS-E or the EBT system) and card issuance functions for the same case. ODJFS did not want the same worker to authorize card issuance (a caseworker or ACO function) and issue the card (a FCO function). Other types of overlap were acceptable as long as adequate controls were in place. For example, a FCO worker could serve as the card inventory manager (also known as vault custodian), as long as a supervisor or ACO worker cosigned the card inventory records. ODJFS policy recognized the need for staff to serve in multiple roles, as long as they did not do so at the same time. To ensure adequate separation of duties, ODJFS stressed this requirement in training for the county staff and followed up during management reviews and other visits to county offices.

In practice, county staffing patterns varied considerably between large and small offices. During recipient conversion, the largest offices typically had all of the designated roles staffed by different people at a given time, and often added staff to perform scheduling and reception duties. Workers sometimes rotated among the different roles (e.g., ACO, FCO, and trainer) on different days to familiarize themselves with the jobs; this cross-training became more common as the focus shifted from mass training to ongoing recipient support. The largest county, Cuyahoga County, contracted out the training and initial card issuance functions to a private firm during conversion (as discussed later in the chapter) and afterwards shifted these functions to CDJFS staff.

In small offices, individual staff members more often filled multiple roles, because there were not enough workers to separate all of the EBT roles. Also, in smaller counties it was particularly important for each EBT staff member to be capable of playing multiple roles. Otherwise, there might be no one available to cover for an absent staff member. Separation of duties was somewhat easier to attain during recipient conversion, when additional staff were temporarily available, than afterwards. Even during conversion, however, some small offices found it impossible to maintain the full separation of duties (for example, needing to have caseworkers or supervisors perform FCO duties). The close relationships of staff in these offices and the small number of cards issued mitigated the risk of temporarily entrusting workers with the combination of authorization and card issuance roles. Nevertheless, ODJFS monitored the separation of duties and regularly reminded all offices of the importance of this policy.

Whenever possible, counties drew on their existing food stamp issuance workers to staff the EBT conversion effort. The size and composition of the available food stamp issuance staff varied considerably, because the counties used a variety of benefit issuance systems prior to EBT implementation. Most counties had contracted out all or most of their food stamp issuance, either to mail issuance vendors or to local over-the-counter issuance sites (such as check cashers). Thus, most counties did not have a work force of food stamp issuance clerks proportionate to their size. County offices without food stamp issuance staff used income maintenance staff when possible, but otherwise they drew from other departments to fill the staff positions required to implement off-line EBT. Many counties had reduced staffs in response to the decline in welfare caseloads prior to and during conversion. Some counties used recent retirees from their departments to supplement their current staff.

One county (Cuyahoga) contracted with a private firm to provide recipient training and issue cards for conversion, largely because concurrent reorganization and welfare reform efforts made it too difficult to staff the conversion internally. County FSP issuance staff and photo ID staff performed the most sensi-

tive conversion functions and provided customer support to recipients after conversion. The contractor employed TANF work experience participants to issue cards and perform other clerical functions. Several of these contractor employees were later hired by the CDJFS to continue providing EBT customer service.

The staff from other departments and the contractor staff in Cuyahoga County required additional training, because they first had to learn about the FSP and the CRIS-E system before learning about food stamp distribution under the Direction Card system. Where there was a sufficient number of food stamp issuance staff, the county generally had an easier transition to the EBT environment. Even some of these counties, however, had to provide supplementary CRIS-E training for their former food stamp cashiers, who had previously used only a few CRIS-E functions.

Site Preparation and Equipment Installation

If the site visits and subsequent consultations identified site modifications that were needed, the county was responsible for making these modifications prior to the EBT equipment installation. The sites where the EBT equipment would be installed had to have suitable electrical and telephone lines, and the CMS had to have access to the data network used for CRIS-E access (although CACI was responsible for the actual cabling to establish the CRIS-E connection). Common activities included: adding or reassigning telephone lines, building counters or shelves, and obtaining or moving furniture. The timing of these preparations had to be coordinated with CACI's schedule for installing the EBT equipment, and some site preparations (particularly telephone service work) required orders to be placed two months or more in advance. In some counties, the site preparation was coordinated with other renovations or relocation to new offices, but this county requirement occasionally delayed EBT conversion.

Installation of equipment in county offices typically occurred after the majority of retailers had already been installed. CACI installed equipment at a time chosen by the county. The installation schedule was usually consistent with the original target dates for staff training and the start of recipient conversion, but it was sometimes later than planned because of delays by the county in site preparation or changes in plans for the siting of equipment.

Although there were fewer county offices than retailers, installing equipment in each office took much more effort, technical expertise and time than installing an individual retailer. Installation of equipment took as little as one-half day and as much as three days. Some offices were especially difficult to equip because they had old facilities. For example, in some cases the conduits needed for EBT computer cables and wires were inadequate, requiring CACI to arrange with the county for installation of new conduits.

Another challenge arose in counties where the county had switched from the original CRIS-E technology of terminals and controllers to the use of personal computers sharing connections to the CRIS-E main-frame through a local area network (LAN). Counties that converted to LANs largely eliminated the use of controllers and the dedicated telephone lines connecting them to the CRIS-E inter-office network. This change posed a problem, because the EBT CMS needed be connected to the CRIS-E inter-office network via the original controllers (as specified in the Request for Proposals and the Direction Card system design). Planning to deal with LANs was complicated by the fact that ODJFS delegated substan-

tial discretion to the CDJFS regarding decisions about county office computer systems, including the choice to upgrade to a LAN.

In all but one of the counties that installed LANs before EBT conversion, the controllers were still available, but CACI sometimes had to expend considerable effort to locate the controllers and connect the CMS. ODJFS and the Citicorp EFS team explored the possibility of connecting a CMS to the most common type of LAN, but they found this approach to be infeasible. ODJFS subsequently devised a solution for the CMS to share the telecommunications lines used by the LANs, as discussed later in the section on technical problems during implementation.

In Franklin County, however, the installation of LANs caused more significant difficulties for EBT implementation. The county was building new offices that would use LANs for CRIS-E access, and these offices did not have controllers or the dedicated lines to serve them. The county wanted to connect the CMS to its LAN, but ODJFS thought this was not feasible. The Citicorp EFS team was unwilling to take responsibility for making the necessary modifications to the CMS, because the request was outside the scope of its contractual responsibilities. This dispute was complicated by the county's choice of a different type of network design from that of the other county LANs. As a result, the county had to use its remaining offices that had controllers for recipient conversion and for almost a year afterwards. The county attempted to devise a solution to attach the CMS to the county LAN but eventually adopted the same technology as the other counties for the CMS.

County Staff Training

Training for county EBT staff typically involved a video, a presentation by a CACI staff member, another presentation by ODJFS' trainer, and a question-and-answer session. A full day of training was provided for each county. The CACI trainer focused on use of EBT equipment and EBT training for recipients. The ODJFS trainer addressed the use of EBT functions on CRIS-E and ODJFS policy regarding EBT. The training was modular, so that staff could attend the segments covering their anticipated duties, but many of the staff receiving training attended the entire day to learn all of the functions and procedures. These training sessions were intended solely for the staff that would be conducting EBT conversion activities (including primary and back-up staff). For other staff, including eligibility workers and supervisors, the ODJFS trainer provided a general orientation or trained county trainers to provide similar sessions. Eligibility workers did not need detailed training on the use of EBT equipment, but it was important to explain to them what was happening and how they could help the process run smoothly.

After the formal training, county staff could conduct self-training using a training mode available on the EBT equipment, but this capability was not used to the extent that ODJFS and CACI hoped it would be. The designated EBT staff often did not have time to use the self-training capability. Counties did, however, contact CACI with follow-up questions after the initial training. During early implementation, some counties contacted CACI once or twice following their initial training, whereas other counties contacted CACI dozens of times with various follow-up questions. CACI staff used this feedback to help focus training efforts in counties subsequently converted to EBT, although the training materials themselves were not revised. When counties began conversion, CACI strongly encouraged them to contact SVS or ODJFS with questions and problems, in accordance with the division of responsibility established for the project. CACI also stressed the use of the built-in user prompts in the EBT software.

CACI initially conducted training the day after equipment was installed, typically four to six weeks before recipient conversion. Starting in early 1998, however, CACI encouraged counties to schedule staff training closer to counties' recipient conversion start dates. In the late implementation period, county staff training commonly occurred only one to two weeks before conversion started. CACI took this action based on feedback from the initial set of counties it trained. This initial set of counties indicated that the training they received was good, but that they had forgotten much of what they learned in training by the time they began recipient conversion. The lack of use of the self-training mode was another reason for the change of timing for staff training.

ODJFS' role in the training was two-fold. First, ODJFS explained the rules and policies governing EBT operations. Second, ODJFS provided training on CRIS-E system functions related to EBT, including use of informational screens and specific data input or editing tasks to be done in connection with conversion. As noted above, this training was especially important to staff who had not previously used CRIS-E. As ODJFS gathered more experience, it modified this training to clarify CRIS-E functions that were often unfamiliar to the county staff assigned to EBT conversion, and to address common shortcuts used prior to EBT that created problems with the advent of EBT. ODJFS also addressed differences between the conventional CRIS-E terminals and the personal computers used for EBT, such as the need to follow different troubleshooting procedures.

Most counties felt that the EBT training was challenging, because of the extent of the material, but they were satisfied with the quality of the training. Some counties expressed a desire for more hands-on training, although they recognized that time for this was limited. For larger counties, a related issue was that they received only a few hard-copy manuals; one county solved this problem by scanning the manual and putting it on its network. Counties of all sizes encountered a different challenge: when staff turn-over occurred during conversion, they were forced to train new conversion staff very quickly, so that they could maintain their schedules.

Challenges of County Conversion

Several unexpected issues arose during conversion to off-line EBT. One issue was disagreement over the extent to which caseworkers were to be involved in off-line EBT. ODJFS policy was that eligibility workers not be involved in conversion. In some instances, however, caseworkers provided clients with information regarding off-line EBT, or attempted to make EBT-related decisions such as when a client would be converted to the EBT system. These disagreements were generally resolved quickly, with caseworkers typically remaining uninvolved in off-line EBT. The help of caseworkers was occasionally needed, however, as when an action was needed to make a recipient's file available for conversion.

Another challenge that had to be addressed under off-line EBT was managing new computer system "profiles." In the CRIS-E system, each staff member has a security profile. The profiles determine which staff can view and change various data records and elements. Under the coupon issuance system, all issuance staff had the same profile. Under the EBT system, the various staff involved in the distribution of food stamp benefits have distinct CRIS-E profiles consistent with their roles in the issuance process. For example, there is one profile for FCO functions (mainly card issuance), another for ACO functions (identification and troubleshooting), and another for supervisors who may have to cover FCO or ACO duties. This separation of roles and access to system features protects the security of the system.

ODJFS created the profiles and explained them to county system administrators during the conversion process.

After equipment was installed in a county office, the county system administrator assigned EBT profiles to the designated staff. As discussed previously, smaller counties initially had difficulty making their staffing patterns fit with the standard EBT roles, which made it difficult to operate within the EBT user profiles. ODJFS worked with the counties to refine the user profiles and the assignment of profiles to staff, so that the counties could operate within their staffing constraints while maintaining the desired level of security and separation of duties.

In some larger counties, the established assignment of security profiles to staff conflicted with the needs of the EBT implementation process. Staff performing the ACO functions needed the ability to update certain information in recipients' files in CRIS-E. (These changes could have been made by caseworkers, but most counties sought to minimize the caseworkers' role in recipient conversion.) In some large counties, the caseloads were divided into segments according to the designated supervisor. The security profiles assigned by the county system administrator allowed a given individual access to only one or two supervisors' caseloads at a time. This arrangement was not a problem when a site served only a specified segment of the caseload, but it sometimes meant that a worker could not serve a recipient without the intervention of computer systems staff to change the profile. These situations most often arose when a recipient appeared at the wrong location, or when a recipient served by one unit in the office appeared at a time when conversion workers did not have access to the cases in that unit (because recipients in other units were scheduled for conversion). ODJFS sought to minimize these problems by structuring special user profiles that would provide the needed access with suitable controls, but some county officials chose not to take advantage of these profiles.

Changes in county operations to implement welfare reform posed a number of challenges for the implementation process. As noted above, welfare reform had brought staff reductions in many counties. In Franklin and Cuyahoga Counties, the county decided to open additional offices in order to provide more customer-friendly services as they implemented Ohio Works First, the State's version of the Temporary Assistance to Needy Families (TANF) program. The additional equipment needed for these new offices was not covered by Citicorp EFS's contract, which allocated equipment based on the number of existing offices and the caseloads at the time of the RFP, not the date of implementation. To fill this gap, ODJFS purchased additional equipment and leased it to the counties.

Finally, a critical element of county preparations for recipient conversion was establishing the necessary management and supervision of EBT functions. In counties of all sizes, EBT conversion required a variety of management functions, including staff supervision, trouble-shooting card and equipment problems, ordering cards and maintaining inventory, and overseeing tracking and reporting processes. For the EBT coordinators in larger counties, this was a full-time job, and they had considerable difficulty if they were trying to keep up with other responsibilities. Where multiple EBT conversion sites operated, the county needed a well-trained and effective site leader in each location.

4.6   Recipient Conversion Activities

After CACI installed EBT equipment in retailers' and counties' facilities, counties began the time-consuming process of converting recipients to the Direction Card system. County staff scheduled appointments, trained recipients to use the new system, completed the processing required to initiate recipient accounts on the EBT system, and confronted numerous challenges.

Scheduling Recipients for Conversion

The counties used a variety of methods to alert recipients that EBT conversion was coming. Notices were inserted in mail food stamp issuances or handed out with over-the-counter issuances. Posters were put up in county offices. Counties worked with local newspapers and other media outlets to obtain advance publicity. EBT coordinators and other senior staff explained the conversion process to local human service and community-based organizations, particularly those that served the elderly or other groups that might have difficulty with the system.

All counties scheduled recipients for conversion, rather than waiting for them to come into the office for other reasons. The county typically mailed each recipient a notice indicating a date and time when he or she was scheduled to receive a card and training. The appointment was not mandatory (i.e., there would not be adverse action affecting benefits if the recipient did not appear), but the notice communicated a clear expectation that the recipient should attend and that all recipients would be converted to EBT. Some counties offered recipients the option to schedule their own appointments or to change their scheduled appointments, while others merely indicated when recipients could get converted if they could not come at their scheduled times.

The scheduled approach accelerated the process, and it enabled staff to proceed on a more systematic basis. On the other hand, counties had to establish systems for scheduling and tracking recipients, and they had to devote considerable staff time to sending out notices and updating their tracking systems, particularly when recipients had to be scheduled several times before they came in for conversion.

Neither CRIS-E nor the EBT system provided the necessary scheduling and tracking capability, so counties developed a variety of processes. In the smallest counties, manually-maintained logs of food stamp issuances or printouts from CRIS-E were commonly used as recipient rosters for scheduling and tracking. Some small counties compiled spreadsheets for scheduling and tracking recipient conversion. ODJFS printed mailing labels from the CRIS-E database upon request, and some counties used the files created for this purpose to load their tracking systems. Larger counties typically developed computerized tracking systems that used monthly data extracts from CRIS-E to identify the recipients needing conversion. Developing these systems within the tight timeframe for conversion was a challenge, particularly when the systems had to support simultaneous updates by different staff in different locations.

Particularly for the large counties, it was difficult to keep the recipient conversion databases up to date. Given the time lags between data extracts and mailings, and between mailings and appointments, recipients often received second or later notices after they had been trained, and many notices were returned because recipients had changed addresses. Additional challenges included technical difficulties with tapes and limited availability of efficient, reliable staff to do the tedious work of mailings, handling returns, and updating the database.

One of the greatest challenges for many counties was getting recipients to come in for conversion. Some smaller counties had attendance rates as high as 70 to 80 percent on the first notice, whereas large counties often experienced rates of well under 50 percent. As expected, recipients who failed to appear for their first conversion appointments had a lower attendance rate for later appointments, so there was a problem of diminishing returns. (Later sessions also were subject to "no-shows" resulting when recipients were booked after they already had been converted, because of lags in tracking systems.) After one or more notices, recipients usually had the option to get trained on a walk-in basis. Indeed, a few counties stopped scheduling and did all training on a walk-in basis when scheduling was no longer productive.

The low and often unpredictable attendance rates forced counties to overbook the training sessions, in order to keep staff busy, but they had to be careful not to overload the waiting areas and training space. An added complication was that attendance rates varied by time of day, with late morning and early afternoon being the most popular times. Thus, it was difficult to make the best use of the conversion staff. Also, when recipients got their final notices and knew that they had to get converted before their next issuance date, the county had to be prepared to manage large crowds.

A number of counties offered evening or Saturday conversion sessions to accommodate working recipients. Conversion could only be conducted when the CRIS-E system was available, so evening and Saturday hours were limited. (CRIS-E was unavailable after 7 PM on weekdays and 2 PM on Saturdays.) One small county solved both its space problem and the issue of accommodating working recipients by conducting nearly all of its conversion sessions on Saturdays, when no other business was being done.

Most counties gave recipients two notices before "forced conversion," whereby the participant's benefits were issued via the EBT system and could only be accessed by obtaining a card. Some counties, however, gave four or five chances for voluntary conversion. The choice of when to do forced conversion was a difficult and sensitive one. Requiring conversion after two notices speeded up the process and made the most efficient use of staff. On the other hand, forced conversion tended to create more fluctuations in the workload, crowd control issues, and the risk of backlash from the community. The largest counties were particularly sensitive to the latter issues and tried to do as much of their conversion as possible on a voluntary basis, but even they eventually had to resort to forced conversion to complete the process. Neither ODJFS nor the counties tracked the attrition among recipients that never appeared for training, but it was generally believed to be low. If a recipient failed to get training, the recipient's benefits would not be picked up and would expire. The county would wait until the recipient's next recertification appointment and see if the recipient came in before initiating a case closure.

Recipient Training and Card Issuance

CACI and ODJFS provided support to each county for the startup of recipient training and card issuance. A CACI technician checked that all equipment and telecommunications connections were working properly on or immediately before the first day of training, and a CACI trainer was on-site for the first day to provide support and resolve any technical problems with the EBT equipment and software. ODJFS also provided an EBT team member on-site for the first day to provide guidance and to trouble-shoot problems with the portions of the CRIS-E system used in the recipient conversion process.

The county staff typically conducted a practice training session for the ODJFS representative before beginning to train recipients, and the ODJFS representative reviewed the county's planned client flow.

For the earliest counties, the ODJFS representative stayed on-site for the second day of recipient conversion; later in the process, ODJFS did this only if there were problems on the first day. On a few occasions, the staff designated to convert recipients were inadequately trained, or the staff trained by CACI had been replaced before the start of conversion. In such instances, the ODJFS representative took over the necessary functions for the first day and helped ensure that trained county staff would be available thereafter.

After the first day of recipient conversion, CACI provided some support by telephone as a courtesy to the counties, but most calls went to SVS, which was responsible for providing ongoing hotline support. When county staff had mastered the basic procedures addressed in CACI's training, their needs for support shifted to more complicated questions or problems that required the support of SVS or ODJFS. SVS provided all support via telephone. ODJFS provided support via telephone, e-mail, occasional meetings of counties, and, when a county experienced serious problems, with on-site visits.

The standard process for recipient conversion began with a check-in procedure, when the recipient showed identification and signed a log, as mandated by ODJFS. A county staff member (i.e., an ACO worker) at the check-in desk opened the recipient's food stamp case record on CRIS-E. The check-in worker made sure that the recipient's household was currently authorized to receive food stamp benefits, and that the case record was available for update. (If an eligibility worker had placed a hold on the case, the issue causing the hold had to be resolved before the household could be converted to EBT. In some large counties, the recipient had to make a separate trip to meet with the eligibility worker at another site.) The check-in worker filled in a screen with identifying information to be used by SVS customer service, noted the household's issuance date, and changed the benefit delivery mode to EBT. Before sending the recipient to training, the check-in worker handed an EBT brochure to the recipient and, where county procedure required, gave the recipient a form to track the receipt of training or a number indicating when the recipient would be served.

After check-in, recipients went to group training sessions. Group sizes varied widely, from small groups of less than ten to large groups of 40 or more, depending on the size of the recipient population and the space available. The group training usually began with a brief introduction, followed by a showing of the 11-minute video produced by Citicorp EFS. The trainer then summarized and repeated the key points of training, including choosing issuance sites, safeguarding the card and PIN, how to load benefits, how to make purchases, how to check the balance, and what to do when encountering problems. If the issuance schedule was to be staggered, the trainer would explain how to know when monthly benefits would be available for loading. Trainers generally encouraged recipients to ask questions about the new system and scheduled a considerable amount of time for such questions.

The trainer would usually ask the recipients to think about their PINs and their issuance sites near the end of the live presentation, so that they would be ready when the time came for them to get their cards. Some counties developed charts listing stores and their codes to facilitate the selection of issuance sites.

Hands-on practice was an important element of the recipient training, as a way to reinforce the instruction and verify that recipients understood how to use the Direction Card properly. Each training site had one or two POS terminals programmed for training and a set of special color-coded training cards. The trainer often conducted a demonstration of a purchase transaction before asking recipients to practice with the training cards and POS equipment, but in some counties, the training proceeded directly from

the verbal presentation to recipients practicing. Recipients often practiced in pairs, one playing the role of the shopper and the other acting as the clerk entering the purchase amount. If the recipient did not successfully complete the transaction, CDJFS staff would provide additional assistance. In very large groups, it was sometimes difficult to provide every recipient the opportunity to practice using the card and POS terminal.

As counties became more experienced, the live training evolved in a number of ways. Trainers refined the balance between getting all necessary information across and keeping training concise to maintain client flow and the attention of the recipients. Trainers emphasized common concerns and problems. One difficult concept was the difference between where to load benefits (the three selected issuance sites or the county office) and where to shop (any participating store). Another important point was avoiding the mistake of entering the balance when doing a balance inquiry at a POS terminal; if a recipient did this and approved the transaction, the balance would be wiped out. The trainers had to emphasize the distinction between the limited time to pick up benefits before they expired and the unlimited time to spend benefits after they were loaded on the card. For many recipients, especially in more rural areas, the concept of a debit card was new and needed emphasis. Recipients had to be reminded repeatedly to call the customer service hotline, not their caseworkers, to resolve EBT problems. Trainers also learned to emphasize issues of timing inherent in the off-line EBT technology, including the time lag for benefit transfer when cards were replaced and the need to get card replacements no later than three days before the end of the month (so that benefits would not expire before they could be picked up with the replacement card). Last but not least, trainers stressed the need to take care of the card, pointing out such precautions as keeping the card away from children and pets.

After the group training, each recipient went in turn to a card issuance worker (i.e., a FCO worker), who first verified the recipient's demographic information. The recipient signed a card issuance log, selected a PIN and three stores to serve as issuance sites, and received the card. This process provided another opportunity for the recipient to practice inserting the card and entering the PIN. In addition, the card issuance worker reminded the recipient that he or she would be able to load benefits only at the selected issuance sites or the county office. The card became active when the recipient's benefits were first posted to the EBT system, usually when the recurring benefits for the next month were made available. For newly certified recipients, the card usually could be used 24 to 48 hours after both card issuance and initial benefit issuance had occurred. The timing of benefit availability for new recipients depended on when the card and benefits were issued, where the recipient chose to pick up the benefits, and when the retailer or county office POS was settled and received the issuance data. Local offices settled their POS terminals every morning so that benefits staged overnight could be picked up as soon as possible, but benefit availability at retail locations was not often as timely because of when retailers chose to settle.

FCO staff quickly learned the basics of first-time card issuance, but they typically needed four to six weeks to become truly comfortable with the primary FCO functions, and less-frequently used functions (such as coupon conversion) often took longer to learn. Thus, turnover in these positions posed challenges for local supervisors, particularly where the conversion process was lengthy.

The process whereby recipients selected stores to serve as issuance sites was relatively straightforward in small to medium-sized counties, but the large and fluctuating retailer populations in large counties posed some challenges. The EBT system provided the capability to print lists, but these had to be updated frequently because of retailer turnover. In large cities, the major supermarket chains typically had

numerous stores, and the EBT system provided only the street address and zip code to identify specific locations. The system did not support a search by proximity to an address, but it did allow searches by store name or ZIP code. County staff sometimes learned to identify the stores that were most heavily frequented by food stamp recipients, and they used this information to speed up the process. County staff were careful, however, not to steer recipients to specific stores; instead, they worked with recipients to identify convenient stores based on location.

The county EBT staff encountered a variety of technical impediments related to CRIS-E during the start-up of recipient conversion. As noted earlier, ACO or FCO staff sometimes could not get access to individual records on CRIS-E because of security profile restrictions. The CRIS-E system was sometimes slow or unavailable, although extended downtime during regular office hours was rare. Occasionally, the controller linking the CMS to the CRIS-E system would fail, rendering the CMS inoperative. Unless a spare controller was available on site, this situation might halt conversion for a day or more.

CMS failures were not common, and CACI responded on-site within three hours of trouble calls, but conversion efforts slowed down in the instances when this vital equipment was unavailable. As discussed later in this chapter, some early users encountered difficulties with the CMS because of flaws in the CMS software that appeared and were resolved during the early implementation period. CACI found that, on some occasions, confusion or inexperience with personal computers led users to make errors that caused or exacerbated problems with the CMS. Unlike EBT staff in some on-line states, the county EBT staff in Ohio were not dependent on real-time on-line communications to the EBT host to issue individual cards and perform other customer service functions.

During early implementation, one common user error occurred when an FCO worker assigned a card to the recipient's payee number remaining on the screen from the previous card issuance. This "duplicate payee" error meant that the first card was invalid and the second card was linked to the wrong payee number (i.e., the recipient with the second card would get the benefits intended for the recipient issued the first card). Usually the problem was caught during end-of-day processing and the affected recipients came in to have the problem corrected, but occasionally a recipient got the benefits intended for another recipient. To prevent these errors, SVS modified the CMS software so that it warned the FCO that a "duplicate payee" condition existed and required confirmation before proceeding to assign the payee number to a second card.

The end-of-day process to upload all activity on the CMS (known as CMS settlement) was at times quite lengthy and, like any data transfer, occasionally subject to failure. The length of time for settlement forced county staff to stay late or stop the conversion process for the day earlier than desired. During the early implementation period, the CMS daily received the entire retailer file, which grew rapidly and took longer to download as retailer conversion progressed. In late 1998, SVS modified the CMS and host software so that daily transmissions only contained updates to a file loaded when the CMS was installed. Problems with the availability of the dial-up network used for settlement sometimes affected CMS settlement, as did occasional failures of the host hardware that supported the dial-up access. Occasionally batches of card issuance records would be lost, or county staff failed to check whether the settlement had completed properly before leaving the office. When card issuances were transmitted properly but failed to show up on the EBT host, the counties sometimes had to send the information by fax to SVS customer service, where the transactions were manually entered. By mid-1999, most counties apparently were not having problems with CMS settlement, but a few still had persistent problems.

County staff were often concerned about whether elderly and disabled recipients would have trouble with the conversion to the Direction Card, and they made extra efforts to accommodate these recipients. County staff made special arrangements to secure transportation for residents of senior citizen housing or to provide training to recipients for whom the regular training site was not accessible. Elderly and disabled recipients were not exempt from having to come to the county office to get cards and PINs, but they could use friends, family members, or community service workers as alternate shoppers, just as they could under the coupon system. If an alternate shopper had been designated as an authorized representative by a recipient, the shopper was identified in CRIS-E and therefore received a conversion notice.[7] Counties encouraged alternate shoppers to attend training with the elderly or disabled recipient, but the alternate shoppers could also go separately to training if the scheduled time for the recipient was not convenient. For authorized representatives who were responsible for large numbers of recipients (such as staff in group residences), converting to EBT required them to manage a card and PIN for each recipient, instead of just pooling the food stamp coupons issued to the recipients. These staff sometimes asked each recipient to chose the same PIN, to simplify use of the cards when shopping on behalf of the recipients.

According to county staff, the response of elderly recipients to EBT conversion was mixed. Some counties reported that older recipients were the most responsive and attentive trainees. Other counties indicated that a substantial proportion of their older recipients were reluctant to accept EBT and refused to come in for conversion. These counties later found that a substantial portion of these potential "dropouts" came in for their cards within one or two months of having their benefits involuntarily switched to EBT. Both of these patterns are consistent with the experience of Citicorp EFS in on-line EBT states.

ODJFS, Citicorp EFS and the counties made a variety of efforts to accommodate recipients with little or no knowledge of English. As required by ODJFS, Citicorp EFS provided brochures in Spanish, the primary language other than English in Ohio, and county staff fluent in Spanish provided training. For some of the counties with large Spanish-speaking populations, the lack of a Spanish video was seen as a problem, and at least one such county considered producing its own Spanish video. For other languages, counties had to provide their own resources, typically through live instruction by staff interpreters or through the assistance of recipients' bilingual friends or relatives. A few counties provided group training in languages other than English or Spanish, because there was sufficient need for this service.

Recipient Concerns

Predictably, as recipients began to use their EBT cards, they encountered a variety of difficulties. Recipients were instructed to seek help in resolving card-related problems by contacting the SVS customer service center or their local county office. Recipients were given a toll-free telephone number they could use to reach SVS customer service to report problems 24 hours a day. They were also encouraged to contact the ACO staff at their county office with questions. Both customer service and the ACO staff helped recipients to determine the nature of the problem and identify appropriate solutions.

It was sometimes possible for ACO staff to resolve recipients' problems quickly and easily. In other cases, they needed to contact SVS customer service for assistance or approval, because of security

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7   An authorized representative can apply for benefits or provide updated eligibility information on behalf of a recipient. An authorized shopper is someone formally or informally chosen by a recipient to redeem food stamp benefits.

features in the EBT system design. For instance, ACO staff were required to obtain authorization codes from SVS to replace lost, stolen, or damaged cards, or to unlock cards under some conditions. In most counties, the ACO had to call SVS customer service, and this process was slow if the operators were very busy. The CST units were used in the largest counties for this purpose, thereby avoiding a bottleneck. As ACO staff become more used to the CST units and had more time to devote to helping recipients who had already converted to EBT, they also used the CST units to research problems for which needed information was on the EBT host, instead of calling SVS customer service. If the recipient contacted SVS, customer service staff would try to address the problem, but would refer the recipient to the county office if additional information about the client was required to resolve the problem or if the card had to be unlocked or replaced.

The most common reasons that recipients needed assistance during the early post-conversion period were balance inquiries; lost, stolen, or damaged cards; forgotten PINs; delayed benefits; and questions about the issuance amount.

During the late implementation period, the volume of recipient requests to the SVS customer service operators for balance information grew to as many as 58,000 calls per month. In 1999, these calls repre-sented, on average, 31 percent of the caseload. The high volume of these calls was due in part to the inexperience of recipients with EBT, but two other factors specific to the Direction Card system were also at work.

First, the timing of making benefits available, particularly for newly-issued cards, was complicated for recipients to understand. To make benefits available for the first time, the following steps had to happen:

- card issuance by the county office
- card information uploaded and posted on the EBT system
- benefit issuance information transmitted to the EBT system
- benefit and card records linked
- benefits downloaded to the recipient's issuance sites.

This process could take as little as 12 hours, but it could also take 48 hours or more. This element of uncertainty led many recipients to call SVS to check their balances.

Longer but more predictable lags would exist for recipients who got their cards during one month as part of the conversion process and had their first EBT issuance the next month. This would happen if the conversion took place after the recipient had already received food stamps for the month, so that the next months' benefits would be the first issued via the EBT system. Even these recipients might experience delays if they went to an issuance site that had not yet downloaded their benefits through settlement.

Second, some recipients had difficulty using SVS' Audio Response Unit (ARU), which was intended to provide balance information to recipients without operator intervention. Use of the ARU for balance inquiries during most of the implementation period was infrequent. This was partly because recipients were unfamiliar with the technology or were more comfortable talking to a live operator, but also because of data problems and the instructions given by the ARU scripts. For balance inquiries, the recip-ient had to enter the card number and date of birth. This information, which came originally from the

recipient via entry by a county worker on CRIS-E, was frequently incorrect and required county office intervention to correct. In addition, the ARU script was designed to provide clients with easy access to operators, and many recipients who might have been able to use the ARU for balance inquiries chose instead to request a live operator. In June 1999, SVS modified the ARU to eliminate the date of birth requirement for balance inquiries and to encourage recipients to try using the ARU before requesting a live operator. These actions increased the share of calls handled solely by the ARU from less than 10 percent to over 40 percent.

Lost, stolen, or damaged cards represented the most common reason preventing recipients from using their benefits. During the implementation period, county offices replaced cards for 3 to 4 percent of the caseload each month. Although ODJFS and the counties considered recipients to be responsible for most card replacements, other factors contributed to the incidence of replacements. Occasionally, a county received defective cards. There was a batch of cards supplied to several counties that had a misplaced computer chip, leading to a high failure rate for those cards. Also, counties replaced functioning cards as a substitute for more cumbersome procedures to solve certain problems with access to benefits (such as the duplicate payee problem discussed earlier). Some counties reported to ODJFS and the Citicorp EFS team that certain retailers' POS terminals appeared to damage cards, but the Citicorp EFS team did not find evidence supporting these impressions when they examined the suspect terminals.

ODJFS planned to implement a fee for card replacements, with the hope of improving recipient account-ability for cards. Most counties supported this plan. In late 2001, this fee was implemented on a trial basis in one county. As of May 2002, ODJFS remained committed to statewide implementation of a replacement fee, but the schedule was still uncertain. The replacement fee policy was delayed by a number of policy and technical details, including getting FNS approval for the fee, negotiating contrac-tual arrangements with Citicorp EFS for collecting and settling the fees, and determining when and how to waive the fee. After these issues were settled, the final and most significant obstacle was the cost of updating the CMS software and training staff on the new policy in all 88 counties. ODJFS was hesitant to bear this cost, because most of the fees would go to Citicorp EFS and FNS, and Citicorp EFS's contract did not include the cost to implement the fee.

Other reasons for recipients needing assistance were less common. About 2 percent of the caseload experienced card locks each month because of making too many bad PIN entries. For some of these cases, this experience delayed access to redeem benefits until they had their cards unlocked; for others, the locks protected them against fraudulent attempts to use their cards.[8] Disputes occasionally arose when recipients did not receive the amount of benefits they expected, but these problems rarely were caused by EBT worker errors or system glitches. Instead, most of these problems resulted from a mistake or a misunderstanding about the amount of benefits authorized, or else benefit availability was delayed at a particular site because the retailer had not settled timely. On occasion, authorized benefits were not made available to a recipient's card when expected because of an error in setting up the card, or because the CMS had not properly transmitted the card data to the EBT host.

Some recipient problems were known but not tracked, so they cannot be quantified. Recipients reported to the county offices that they experienced a variety of problems when they attempted to use their Direc-

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8   No data are available to differentiate between these two causes for bad PIN locks. In the post-implementation period, the rate of card locks due to bad PIN entries dropped to 1.4 percent of the caseload.

tion Cards for the first time. Some retailers were not prepared to accept Direction Cards when recipient conversion began, or told recipients that they were not accepting the cards. Another recipient concern was retailers not settling on a daily basis, so that the most recent benefits were not available. Recipients also reported that they had to help poorly-trained checkout clerks to process transactions.

County Operations

In addition to the recipient service challenges described above, the county offices faced a number of internal operational challenges during the conversion process. One such challenge was maintaining coordination between Direction Card staff and eligibility workers. After conversion began, it was important to make sure that eligibility workers did not convert any recipients back to coupon issuance, and that they did not place any newly-certified recipients on coupon issuance. Eligibility workers sometimes made these errors, thereby creating extra work for the Direction Card staff. On occasion, new recipients were temporarily placed on coupon issuance in order to ensure that they would receive expedited benefits according to the FSP requirement. Eligibility staff in a few of the counties interviewed for the study reported anecdotally that they made more referrals to food banks during conversion because of delays in benefit availability, but there was no widespread evidence of recipient hardship.

Maintaining an appropriate supply of cards in each office required some balancing between the concerns of the county offices and the vendor team. County EBT coordinators wanted to make sure they had plenty of cards on hand, particularly in the large counties. On the other hand, Citicorp EFS and ODJFS wanted to avoid building up excessive inventories in the counties, both because supplies were not unlimited and because of the cost of the cards. These competing concerns sometimes resulted in counties receiving fewer cards than they ordered, but supplies were always adequate for recipient conversion. An additional challenge arose when the card vendor began shipping a new card version that was not compatible with some of the CMS and POS terminals already deployed. Citicorp EFS carefully managed the remaining supply of the older cards until all county and retailer software was updated to accept the new cards.

A similar but relatively minor source of contention between county and state EBT staff was the question of how much of the food stamp coupon inventory to maintain. The county offices needed modest inventories for converting EBT benefits to coupons when recipients moved out of state (or, prior to statewide implementation, to areas in Ohio where retailers were not yet equipped for EBT). County managers also sought to maintain coupon inventories for emergency use in the event of EBT system failure. ODJFS, on the other hand, wanted to minimize the inventories at the county level. To accomplish this end, ODJFS worked with individual counties to establish appropriate inventory levels.

On occasion, county staff had to respond to calls from retailers seeking assistance to resolve problems involving recipient transactions. Most often, these calls involved transactions in which the recipient had removed the Direction Card before the sale was processed, and the retailer had failed to notice the problem before the recipient left the store. The retailers asked the county staff to contact the recipient to resolve the problem. (Only SVS and the county office could identify the recipient involved from the information on the store's copy of the receipt.) In a few of these cases, the county office intervened in these cases by contacting the recipients and asking them to return to the store. This practice stopped when ODJFS clarified that all such calls should be referred to SVS customer service, and that these problems were the retailer's responsibility.

Customer Service

Handling the volume of recipient and county calls posed a significant challenge for SVS. The volume of recipient calls was not only high but also quite concentrated in the first ten days of the month, when recurring benefits became available. During the implementation period, this was the time when recently-converted recipients were using their cards for the first time. It also tended to be a busy time for recipients requesting card replacements and, therefore, for county staff requesting authorizations for replacements. It was difficult for SVS to provide adequate staff during this period while avoiding excessive staff downtime during the rest of the month. As a result, recipients, retailers and county staff experienced delays in reaching customer service representatives.

County staff also experienced uneven quality of service, with some customer service operators being unable to help or providing inaccurate information. All Ohio Direction Card calls were being handled by the general pool of SVS customer service staff, who were more used to handling the simpler questions and problems related to the prepaid cards that made up the bulk of SVS' business. In addition, turnover among the customer service staff was fairly high. Yet another source of difficulty, particularly for county staff, was the schedule for customer service supervisors at SVS' El Paso site, where the daytime staff came on duty much later than the usual opening time for the county offices in Ohio. As a result, if a county office experienced problems with CMS startup or morning settlement, it was difficult to get timely and informed support.

As noted earlier, SVS established a separate hotline for county and retailer calls in the fall of 1998, with staff trained specifically to handle these more complicated calls. Further improvements included management changes to bring in more EBT expertise, changes in supervisor schedules to better match the daily cycle of calls from Ohio, and hands-on training for agents with actual POS equipment.

4.7   Technical Problems and Improvements During Implementation

During the three-year implementation period, ODJFS and the Citicorp EFS team had to address a variety of technical problems with the Direction Card system, as is inevitable in a large and complex system. The problems with the most immediate impacts on retailers, recipients and county operations have been discussed in the preceding sections. The following discussion highlights a number of additional technical problems that required significant effort and generally resulted in system improvements during this period.

Year 2000 Transition

One issue that raised considerable concern was the "Year 2000 (Y2K) problem," which arose because of programs in computers and other electronic devices that used two-digit values to represent the year in date-based calculations. There was widespread concern that such programs would fail when the year 1999 ("99") ended and 2000 ("00") began, because calculations using the year value would yield anomalous results. FNS issued guidance on addressing this concern to the states with EBT systems, and other federal oversight officials issued guidance to financial institutions that served as or contracted with EBT processors. As a result, the EBT processors, including Citicorp EFS and SVS, were required to conduct extensive review, renovation and testing to assure their systems' readiness to operate correctly during and

after the transition to the year 2000. State Food Stamp Agencies such as ODJFS were required to conduct similar processes to review, renovate and test their eligibility data systems.

The Citicorp EFS team achieved a smooth, uneventful transition to the year 2000 through the devotion of considerable effort to testing and monitoring. SVS had originally designed the Direction Card system to use four-digit years in dates, so major problems or modifications were not anticipated or needed. SVS conducted a 12-day test cycle in October 1998, with the oversight and participation of Citicorp EFS and ODJFS. This test identified some minor flaws in host programs and confirmed that Y2K modifications to the CMS software worked properly. SVS also worked with ODJFS to test and implement new communications equipment, lines and protocols between the SVS and ODJFS host computers, both to update the protocols and to eliminate the role of NPC, the former corporate parent of SVS, as an intermediary in file transfers. Citicorp EFS, SVS and CACI closely monitored the transition from 1999 to 2000 at all vendor operational sites and in selected stores. CACI had pre-positioned extra POS and CMS equipment in preparation for a possible surge of trouble calls, including battery packs so that POS terminals could operate in the event of electrical service interruptions. All vendor and retailer operations transitioned smoothly, and no intervention was required.

The ODJFS EBT team also made a smooth transition through parallel testing and monitoring efforts. The major focus at ODJFS was on the process of reviewing, renovating and testing the CRIS-E system. Although this was a major effort for other parts of ODJFS and its Y2K contractor, the EBT team had a minor role, because the EBT-specific programming had already addressed the need for four-digit dates. As noted, ODJFS technical support staff on the EBT team participated in the SVS Y2K testing and reviewed the test results. The main substantive testing effort at ODJFS involved the change in communications equipment, lines and protocols for file exchanges with SVS. During the transition to the year 2000, ODJFS monitored EBT operations in county offices and the SVS customer service through phone contacts, and the EBT staff visited stores to observe transactions. As part of the CRIS-E transition, county offices opened on January 1, 2000 to test their equipment, and the EBT staff were on call in the event that any problems with the CMS or CRIS-E connections emerged. The transition was trouble-free, to the relief of all involved.

Loading Benefits to Direction Cards

Although the loading of benefits was generally a trouble-free process, experience uncovered flaws in the Direction Card system that prevented recipients from loading benefits in certain situations. The most significant of these problems was identified early in 1998. Although the problem affected a relatively small number of recipients, it caused significant hardship for them and created additional work for county staff. The problem, which was corrected by September 1998, stemmed from the system's assignment of sequential numbers to issuances. To prevent the loading of an unauthorized issuance or credit at a recipient's selected issuance sites, or the duplicate loading of the same issuance at two sites, the system assigns a sequential host reference counter (HRC) to each issuance or other value-adding transaction (e.g., a store refund). These value-adding transactions must be loaded by the recipient in sequential order.

Generally, regular issuance benefit files are transferred from the state's CRIS-E system to the EBT system seven days before the first of the month. Prior to the software fix, each issuance was given a

sequential counter immediately upon receipt by the EBT host, and the only way to increment the HRC on the card was to load the issuance. This led to two types of problems, as described below.

Case 1

In Case 1, John Doe's normal March benefit issuance was given a sequential counter number of 12. Because John did not load these benefits during March, they became unavailable and he was not able to load them at a later date. John was then issued his April food stamp benefits, which were given a sequential counter number of 13. Because John did not load the benefits numbered 12, he was unable to load number 13 without a manual intervention from the EBT service provider.

Case 2

In certain cases, a client may be issued supplemental benefits for the current month, but after the next month's file transfer has been made. The supplemental issuance is batched overnight for immediate availability and is given the next sequential counter. This creates a problem if the supplemental benefits are issued at the end of the month, after the regular benefit files have been transferred to the EBT service provider. In Case 2, John Doe's regular benefit file for March was transferred to the EBT service provider on February 20 and given a counter number of 12. On February 22, John was deemed eligible for supplemental benefits, intended to be available during February. The supplemental file was batched overnight to the EBT service provider and given a counter number of 13.

Because benefits cannot be loaded out of sequential order, in this case February's supplemental benefits could not be loaded until the March benefits were loaded; hence, John Doe had to wait until his next month's issuance date, and had to load the next month's benefits, before he could load benefits intended to supplement the current month's food stamp issuance. As in the previous case, until programming changes were implemented, a manual intervention had to be performed in order to by-pass the sequential numbering system.

In August 1998, SVS implemented a software change to eliminate the "HRC problem." Instead of assigning the HRC when issuances are received from CRIS-E, the Direction Card system assigns HRCs just prior to downloading the issuance amount to the recipient's designated benefit loading sites. This change bypasses the second problem described above, that of supplemental issuances. To resolve the first problem, SVS modified the software to download a zero-value transaction updating the HRC counter when a month's benefits expired, so that the counter on the card would match the counter on the next month's issuance.

As noted earlier, a substantial proportion of recurring and one-time issuances were placed in suspense because of the lack of a matching card record, causing delays in benefit availability, but these delays were generally due to operational problems, not system problems. On relatively rare occasions, ODJFS sent a large number of benefit issuances to be made available to a recipient on a single day (usually as a result of benefit adjustments over an extended period of time). If the number of issuances for a single recipient exceeded a limit, the Direction Card system host did not download all of the issuances to the recipient's issuance sites. In this situation, the missing benefits had to be reissued, causing additional work and delaying the recipient's access to the benefits. This problem was not resolved until after the implementation period, but it was not considered high-priority by ODJFS, because it was rare and could be resolved on an ad hoc basis when it arose.

Issuance History Data

ODJFS and SVS encountered more frequent but less serious problems with the acknowledgment of issuances loaded to recipients' Direction Cards. (After a benefit is loaded to a card, the POS terminal settlement process sends an acknowledgment record to the EBT host, and this information is used to update the issuance information on the EBT host and CRIS-E.) Problems in this area did not prevent recipients from obtaining and using benefits, but they created accounting problems and affected the accuracy of the benefit history. During the implementation period, SVS sometimes did not transmit these acknowledgment data to ODJFS, causing gaps in the issuance history on CRIS-E. ODJFS implemented a procedure to monitor these transmissions and, in the late implementation period, SVS improved its automation to prevent oversights. Problems with missing or invalid data in the acknowledgment files also arose and were resolved. SVS also discovered and corrected a flaw in the EBT system logic that caused a missing acknowledgment record when two or more issuances were posted to a card at the same time. Lastly, SVS devised a process to identify and correct instances when issuance acknowledgments were missing because a retailer did not settle or because POS equipment failed and transactions were not manually restored.

A related issue that entailed a difficult compromise was the timing of final information on the status of benefit issuances. As designed, the Direction Card system provided a monthly file of returned benefits, representing issuances that had expired without being loaded. Returned benefits amounted to about 5 percent of benefits issued. SVS and ODJFS had to work out the optimal timing for this process. On the one hand, ODJFS and the county offices wanted information on participation (and non-participation) for each month to be as prompt as possible, for reporting and case management purposes. A particular concern was for county offices to have up-to-date information if a recipient claimed that benefits had not been issued properly. On the other hand, if the process to return expired benefits was run too soon after the end of the month, it would generate a substantial number of errors because of lags in retailer settlement and the restoration of transactions lost because of equipment failures. These incorrect returns of benefits would then have to be manually reversed on the CRIS-E system. ODJFS and SVS determined that running the return of benefits process on the 17th or 18th of the month yielded an acceptable level of accuracy while providing reasonably timely information, but some county staff continued to view this process as too slow. County staff that needed earlier information could check the status of individual issuances through SVS customer service or by using a CST (if available).

Benefit Transfer to Replacement Cards

Another technical issue involving design tradeoffs was the process for determining the balance to be transferred to a replacement card. The source of the issue was the fact that the card balance did not always match the host balance, because of POS transactions that had not been settled, and because of debits for manual sales that had not been applied to the card. The vast majority of outstanding transactions were settled during the two-day lag between card replacement and the transfer of benefits to the new card, but some imbalances remained. In the original off-line EBT pilot, the system design called for the transfer of the lesser balance, to avoid transferring an excessive amount when a manual sales debit had not been applied to the card. This feature was carried over into the Direction Card system.

When the system began to operate on a large scale, it became clear that this logic was creating a substantial workload of discrepancies that SVS had to resolve, mainly because issuances were not transferred to

replacement cards if the host had not received an acknowledgment. SVS had to review all card replacements on a daily basis and make adjustments where needed to ensure that correct balances were transferred. SVS modified its host programs so that the exact card balance would be transferred to the replacement card, and the host balance would also be transferred as a check against over-crediting the card. This new logic was placed in production in September 2000, as part of upgrades for the pilot test of the WIC/FSP EBT system.

POS and CMS Software

SVS made a number of revisions to the POS software during the implementation period. The largest effort was the adaptation of the Direction Card POS software for retailers and county offices to operate on the Jigsaw POS terminals, which were first deployed in October 1998. SVS later had to download an updated operating system to the Jigsaw terminals, in order to accommodate a new version of the PayFlex smart card that was not compatible with the previous operating system. (For the county offices, this update had to be done on site. The change of cards did not affect the older Datacard POS terminals installed prior to the adoption of the Jigsaw model.) SVS made several modifications to the Direction Card POS software to correct problems that created errors or caused terminals to fail. In addition, SVS made other POS software changes to reduce settlement times and to improve database management. Each time a new version of the POS software was released, SVS downloaded the changes to the installed POS systems during the settlement process. In some cases, this process required contacting each retailer to have the POS system restarted after settlement, a laborious process that extended the time period required to implement the changes but still avoided the greater effort of reloading software at each store.

One particularly significant change to the POS software was the implementation in the fall of 1998 of "regionalization," a procedure designed to limit the size of the file of lost and stolen cards (the "negative file") downloaded to the single-lane stores. The reason for this feature was that the stand-alone POS terminals in these stores would lack the memory to hold the entire "negative file" for all or even most of the state. (The PCs functioning as network servers in the multi-lane stores had adequate memory to hold the entire negative file.) With the implementation of regionalization, the single-lane POS terminals received only the negative files for their home regions, which usually included most or all of the adjacent counties. If a card from outside the region was presented, the terminal software required an authorization code (to be obtained from SVS customer service) to process the transaction, so that SVS could verify that the card was not lost or stolen. The volume of these out-of-region transactions was not tracked on an ongoing basis, but only 95 were processed in October 1999.[9] SVS began by defining five regions, but later each county had its own region of associated counties, with the size of the region varying to keep the negative file at a manageable size. Even with some counties having very compact regions, the negative files were sufficiently large by the end of implementation that ODJFS sought FNS authorization to lock unused cards after 60 days, so that they could be dropped from the negative file. This proposal was put on hold after SVS made changes to the POS software and file structure to use POS memory more efficiently.

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9   There is no way to know how many recipients may have had purchases denied by merchants (or used other methods of payment) when their cards were identified as out-of-region. ODJFS and the county staff interviewed for this report were not aware of any significant problem of this nature.

The implementation of regionalization also introduced a problem for the county offices, because of a limitation of the CMS software. The CMS provided the capability for a FCO supervisor to change the region to which the card was assigned, so that a transferring recipient could have the card accepted in his or her new county without special processing.[10] This function did not provide the capability to select new issuance sites, however, so the recipient had to do this vital step separately through SVS customer service (or through an ACO, if the county had a CST). In addition, even after the recipient selected new issuance sites, the EBT system did not transfer any available benefits that had not been picked up to the new issuance sites. In fact, the original implementation of the change of region function deleted all of the issuance sites on the card, making it appear that the outstanding issuances were no longer available. (This feature was changed so that the county office where the card was originally issued would remain as an issuance site.) To avoid these problems, ODJFS instructed the county offices to replace cards when recipients transferred between regions, because the card replacement process allowed selection of new issuance sites and made the outstanding issuances available. This was not an optimal solution, because it required the replacement of otherwise usable cards. During the development of the WIC/FSP EBT system, SVS developed a solution to allow restaging of benefits with a change of region, and this solution was implemented in the fall of 2001. Card replacements are still common when recipients transfer, however, because the household composition often changes.

Connecting the CMS to a Local Area Network

As noted earlier, CACI encountered some problems with the installation of the CMS equipment where the county office had converted to using PCs on a local area network (LAN) as CRIS-E terminals. SVS designed the CMS to work with the technology that was standard when the expansion project began, namely "dumb" terminals attached to controllers.[11] For the short-term, the controllers and associated data links to CRIS-E were still available (except in Franklin County, as previously discussed). This solution required the use of extra dedicated telephone lines, and ODJFS did not want to have to maintain the controllers indefinitely. These controllers also were used for certain printers in the county offices, so the problem was not unique to the Direction Card project. With assistance from the EBT technical staff, network engineering staff at ODJFS developed a solution to use a different type of device in lieu of the controller, so that the printers and CMS computers formerly attached to the controllers could share data lines with the LAN. After pilot testing of the new solution in two counties, ODJFS network services staff installed these devices (known as routers) in the county offices in the spring of 2000.

ODJFS EBT staff also developed a new process to acquire the CRIS-E information needed by the CMS, so that a Windows-based PC compatible with the standard CRIS-E LAN could be used as the CMS. The new version of the CMS was implemented on a pilot basis in March 2001 as part of the WIC/FSP EBT pilot. (ODJFS had previously experienced problems with the new CMS that delayed implementation in the FSP pilot site from the planned date of October 2000. These problems did not affect the WIC portion of the pilot, except that separate cards had to be used for WIC and FSP benefits.) The pilot test was successful, but the decision on the statewide roll-out of the Windows-based PC was deferred until the next EBT contracting cycle because of the substantial cost of upgrading the PCs.

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10 ODJFS policy requires a recipient to reapply for food stamps when transferring from one county to another. Before a county office replaces an EBT card for an out-of-county recipient, the recipient must reapply.

11 These terminals were "dumb" because they had no independent processing capabilities.

Reconciliation and Reporting

ODJFS and SVS devoted substantial effort in the late implementation period to reconstructing and recon-ciling the history of benefit issuances, redemptions, and actions affecting the Automated Management Account (AMA) used to track benefit obligations and provide FSP funds for settlement through the Federal Reserve's Automated Standard Application for Payments (ASAP). Each EBT system operator enters information on benefit issuances, returns and expunged benefits to AMA on a daily basis, and daily settlement totals are applied to determine the net amount of outstanding benefit obligations. In 1998, FNS initiated efforts to tighten up the reconciliation of the AMA activity with the separate issu-ance reconciliation reports (FNS-46 and FNS-388) in all states with EBT. For Ohio, this required SVS and ODJFS to reconstruct daily activity for nearly three years, including totals for benefits issued, bene-fits returned to ODJFS (because of expiration or expungement), retailer credits, and entries to AMA.

Prior to August 1998, SVS manually updated the AMA system with issuance and return information. Human intervention made updating susceptible to errors, such as the keying of incorrect issuance amounts or failures to enter issuance or return amounts. In mid-1998, FNS made a batch update process available to states and EBT contractors to automate the AMA updates. SVS implemented the automated AMA entry process in August 1998. SVS reconciled daily AMA activity back to the start of the project and identified missed AMA entries and incorrect issuance and return amounts in AMA, especially during the early implementation period. No errors were identified after SVS implemented the automated AMA entry process. FNS adjusted the AMA by $3.2 million in late 1999, and ODJFS implemented new procedures to monitor and verify SVS' entries to AMA and ASAP.

Finally, in the late implementation phase, SVS and ODJFS worked to refine the processes for reporting and monitoring EBT system activity. After a number of discrepancies in monthly system reports were identified, SVS hired a consultant to analyze and correct the reports. SVS also developed an electronic system for storing and accessing system reports, making it easier for both internal staff and ODJFS to monitor system activity and investigate anomalies. Following a review by FNS that found some shortcomings in ODJFS' reconciliation and monitoring activities, ODJFS assigned a member of its fiscal unit to take over the reconciliation functions from the EBT project director (who had not had sufficient time for these functions. ODJFS also obtained direct access to AMA and ASAP to facilitate the reconciliation process. At the same time, ODJFS initiated a review of the system reports to identify which reports would be most useful for monitoring system activity. ODJFS, SVS and Citicorp EFS all acknowledged that although the vital system reports used in daily operations were accurate and provided the necessary information, it would be helpful to improve the organization and presentation of informa-tion in the system reports. Efforts to reassess and refine the reports continued after the end of implemen-tation, but the time available for this activity was constrained by the small staffs at both ODJFS and SVS, and by the new focus on designing and developing the system upgrades for the WIC/FSP pilot.

Chapter 5
Design, Development and Implementation Costs

5.1   Introduction

A primary objective of this evaluation is to quantify the administrative costs associated with the statewide expansion of the off-line EBT system in Ohio. This chapter presents the analysis of the design, development and implementation costs for the Ohio Direction Card system. System operating costs are analyzed in Volume 2 of this report.

The estimated cost of the resources used in the design and development of the statewide Direction Card system in Ohio was $2.5 million, and the cost for implementation was $17.0 million.[1] Each of these figures represents the costs of a distinct phase of activity.

The **design and development phase** was the transition from the PayEase EBT system in Dayton to the Direction Card system, which occurred during the period of July 1996 through April 1997.[2] Much of the system design and development work necessary to establish a functioning off-line EBT system in Ohio was performed as part of the initial pilot project and is not included in the current analysis. The design and development costs presented here represent the costs of updating and modifying the pilot system for statewide expansion (i.e., designing a system to meet the functional requirements of a statewide EBT system), plus the costs of preparations for statewide implementation (i.e., making significant changes to card, terminal, and host system software and testing the system).

The pilot system was designed, developed, and operated by NPC for FNS. NPC also designed, developed, and operated the off-line PayWest EBT system in Wyoming. Clearly, because NPC's successor, SVS, is on the EBT vendor team, the design and development costs of the expansion to statewide off-line EBT are less than they would have been if the system had been designed and developed independent of the existing systems in Ohio and Wyoming.

The **implementation phase** was the period when all food stamp recipients in the 88 counties in Ohio were converted to the Direction Card system. The implementation phase covers the period from January 1997, when the pilot caseload was converted to the Direction Card system, through February 2000, when the last counties completed recipient conversion.

The cost estimate for implementation includes expenses for all of the activities required to convert Ohio to the Direction Card system. The vendor implementation costs incurred by the Citicorp EFS team were for establishing retailer agreements, equipping and training retailers, and equipping and

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1   All costs presented are in FY2000 dollars. They are adjusted for inflation using the implicit price deflator for the Gross Domestic Product (GDP). Design and Development costs are inflated from 1996 dollars to 2000 dollars. Implementation costs are adjusted for inflation using a weighted average of the applicable GDP price deflator multipliers throughout the implementation period (1997 to 2000).

2   The costs presented here do not include any costs the vendor may have incurred prior to the award of the present contract in June 1996.

training county staff. The CDJFS incurred costs for issuing cards to recipients, converting recipients to EBT benefit delivery, and training recipients. ODJFS incurred costs to assist the CDJFS in preparing for implementation, assist the vendor team in training CDJFS staff, address technical issues with the interface between the Direction Card system and the CRIS-E eligibility system, and oversee the implementation process. The implementation costs do not include operational costs incurred during the three-year implementation period, except for county costs to resolve problems during each county's implementation period.

5.2   Research Design and Data Sources

The following section provides a summary of the research design and data sources used to estimate the design, development and implementation costs of the Ohio Direction Card system. More detailed information is provided in Appendix A.

Vendor Data

The primary source of data used in the analysis of vendor design, development and implementation costs was the financial reporting information provided for Citicorp EFS, SVS and CACI from July 1996 through December 1999. Citicorp EFS reported its actual costs and level of effort on a monthly basis. CACI costs were reported on the basis of billings to Citicorp EFS, but information on actual resource use was reflected in the level of effort and the distribution of costs across reporting categories. SVS provided an estimate of its actual direct costs for the design and development phase.[3] The cost reports provided by SVS for the implementation phase covered only ongoing operational costs, and thus did not provide a basis for identifying true implementation costs (such as the effort to resolve problems left over after conversion from the PayEase system to the Direction Card system). Vendor data on staff time allocation were used to separate design and development costs from other costs during the design phase, and to separate implementation and operations costs during the implementation phase. Additional analysis was conducted to apportion project management and other shared costs between implementation and operations, as described in Appendix A.

CDJFS Data

The design and development costs incurred by the CDJFS were limited to the time spent by the six county staff who served on the County Advisory Board. Costs for CDJFS participation on the County Advisory Board were estimated using information from the Montgomery CDJFS about the cost of providing a Montgomery County representative to the board. To estimate the overhead cost associated with the CDJFS design and development labor, we used the average ratio of overhead costs to labor costs in the sample counties for the implementation cost estimates.

The researchers conducted on-site implementation interviews with EBT and other staff in ten CDJFS offices in two phases. Early implementation interviews were conducted with five counties in March

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3   The SVS cost report for the design and development phase did not include fringe in its labor costs and did not provide overhead costs. We adjusted SVS' labor and overhead costs based on fringe and overhead multipliers used by NPC before NPC formed SVS.

1998. Late implementation interviews were conducted with five additional counties during July 1999, March 2000, and July 2000 (after each county finished implementation activities). For the cost analysis, respondents identified the staff time and other county resources used to perform EBT implementation activities.

County implementation costs include all implementation activities (i.e. planning, staff training, recipient training, and card issuance) as well as operations activities that took place during each county's implementation period (i.e., troubleshooting problems with the cards, unlocking cards, and replacing cards). The estimates include salaries and fringe benefits for county staff, other identifiable direct costs (primarily contracted services), and overhead costs.

The sample included both large and small counties, and it was intended to represent the geographic diversity of Ohio by reflecting the different regions of the state and the mix of urban and rural areas. Exhibit 5-1 below identifies the counties; for each county, the exhibit indicates the caseload during implementation, regional location, implementation phase, and date visited. Because of the timing and focus of the early implementation interviews, half of the counties are in the Southwest region of Ohio, but we do not believe that the distribution caused any bias in the results.

Exhibit 5-1

Profile of Sample Counties

Early Implementation Interviews				Late Implementation Interviews			
County	Average Caseload During Implementation	Region of Ohio	Date Visited	County	Average Caseload During Implementation	Region of Ohio	Date Visited
Clark	5,407	Southwest	3/98	Auglaize	370	Northwest	3/00
Greene	2,083	Southwest	3/98	Cuyahoga[a]	39,084	Northeast	7/99
Miami	1,233	Southwest	3/98	Franklin[a]	25,552	Central	7/99
Montgomery[a,b]	8,425	Southwest	3/98	Lucas[a]	18,199	Northwest	3/00
Preble[a]	559	Southwest	3/98	Morgan[a]	610	Southeast	7/00

a   Counties in the operations interview sample.
b   The Montgomery County implementation caseload excludes the pilot area at the county.

ODJFS Data

To identify design, development and implementation costs, ODJFS provided standard cost reports from its accounting system and additional tabulations of detailed information on costs for personnel, travel, and miscellaneous items. The data used for this analysis covered the period from July 1996 through December 1999. Labor cost data for the design and development phase represented budgeted rather than actual costs, because of the way ODJFS accounted for these costs. For the

implementation phase, ODJFS provided a listing of the level of effort and salary rate (with fringe) for each State and contract employee, with additional task-level detail on contract employee time. Non-labor costs were those assigned directly to the EBT project in the ODJFS accounting system. Reported state costs did not include overhead, and there was no available basis for estimating this component of cost.

All reported ODJFS costs from July through December 1996 were treated as design and development costs. For the period from January 1997 through December 1999, a combination of direct assign-ment and allocation methods were used to separate implementation and operations costs, as described in Appendix A.

FNS Expenses not Included

FNS conducted oversight activities through the efforts of headquarters staff, Midwest Regional Office staff, and technical assistance contractors. The cost estimates for design, development and implementation, however, do not include any expenses incurred by FNS for oversight of the Ohio Direction Card project. When the Ohio EBT project ceased to be a demonstration, FNS' role became essentially the same as in states with on-line EBT systems. Thus, FNS' costs related to the Ohio Direction Card project are considered to be immaterial to future State decisions about the choice of EBT technology. Previous evaluations, including the Dayton, Ohio pilot study, included FNS costs because of the agency's more substantial and direct role in project oversight.

5.3   Overview of Design, Development, and Implementation Costs

Total design and development costs for the Direction Card system were $2.5 million, as shown in Exhibit 5-2. The EBT vendor team incurred the overwhelming majority of these costs, $2.4 million. This figure represents resources expended by the Citicorp EFS team, not the $1.3 million that ODJFS paid to Citicorp EFS for specific design and development phase deliverables. ODJFS incurred about $146,000 in staff labor and other internal costs (not including the payments to Citicorp EFS). A minimal level of expenses was incurred by the CDJFS involved in this phase.

Total implementation costs for the Direction Card system were $17.0 million. Vendor resource costs accounted for the majority, $8.7 million. County costs represented the other major portion, $7.7 million. The balance was incurred by ODJFS. Total design, development and implementation costs were $19.6 million. Of this total, vendor costs accounted for $11.0 million (56.6 percent), county costs were $7.7 million (39.6 percent), and ODJFS accounted for $0.7 million (3.7 percent).

As shown in Exhibits 5-3 and 5-4, the design, development and implementation processes were very labor-intensive, with labor and associated overhead costs making up the bulk of the costs. For design and development, labor and overhead costs were $2.0 million, or 80 percent of the total design and development cost. Design and development-related labor totaled 22.4 person-years. For implemen-tation, labor and overhead costs for regular and contract staff were $14.6 million, or nearly 86 percent of the total implementation cost. Implementation-related labor totaled 277.7 person-years. Other major implementation costs were travel and vehicle leases ($652,952), office space and equipment ($722,867), and stationary and supplies ($591,094). These costs do not include EBT

cards, POS equipment, and administrative terminals, because the depreciation of these items is considered an operational cost.

Exhibit 5-2

Summary of Ohio Direction Card Design, Development and Implementation Costs

Cost Category	Adjusted Costs in Year 2000 Dollars			
	Vendor	County	ODJFS	Total
Design and Development Costs[a]				
Total costs	$2,399,785	$3,987	$109,550	$2,513,321
Total cost per case[b]	$9.05	$0.02	$0.41	$9.48
Total person-years	21.5	0.04	0.9	22.4
Implementation Costs[c]				
Total costs	$8,680,089	$7,744,773	$586,786	$17,011,648
Total cost per case[b]	$32.73	$29.20	$2.21	$64.14
Total person-years	86.9	183.4	7.4	277.7
Total Design, Development, and Implementation Costs				
Total costs	$11,079,874	$7,748,761	$696,335	$19,524,969
Total cost per case[b]	$41.77	$29.22	$2.63	$73.62
Total person-years	108.4	183.4	8.3	300.1

a   Design and development costs are adjusted for inflation. Actual costs are inflated by 6.3 percent from 1996 dollars to 2000 dollars.

b   Cost per case is calculated based on an estimated average implementation caseload of 265,228.

c   Implementation costs are adjusted for inflation using a weighted average of the applicable multipliers throughout the implementation period (1997 to 2000). The inflation factors are as follows: 2.7 percent for vendors, 2.1 percent for counties, and 3.0 percent for ODJFS.
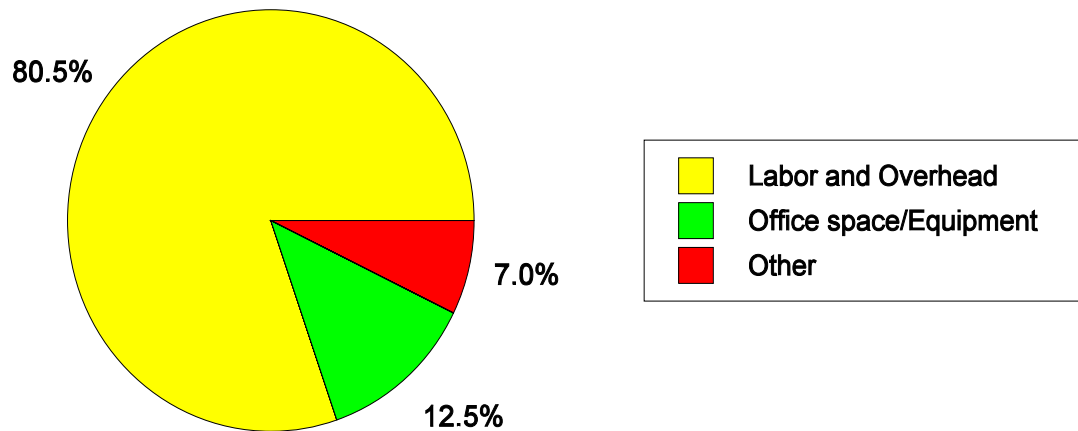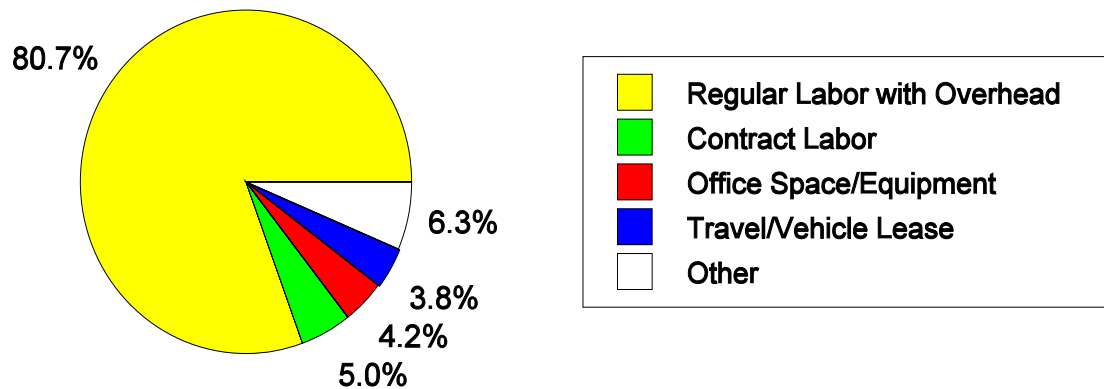
Exhibit 5-3

Total Design and Development Costs, by Cost Category

Exhibit 5-4

Total Implementation Costs, by Cost Category

5.4 Vendor Design, Development, and Implementation Costs

Total Vendor Design and Development Costs

Citicorp EFS and its subcontractors incurred a total of $2.4 million in costs for design and development, as shown in Exhibit 5-5. Of this, $1.9 million was labor costs. The vendor team's reported costs were higher than its revenues for this phase: Citicorp EFS billed ODJFS a total of $1.3 million (in 2000 dollars) for deliverables related to system design and development.[4]
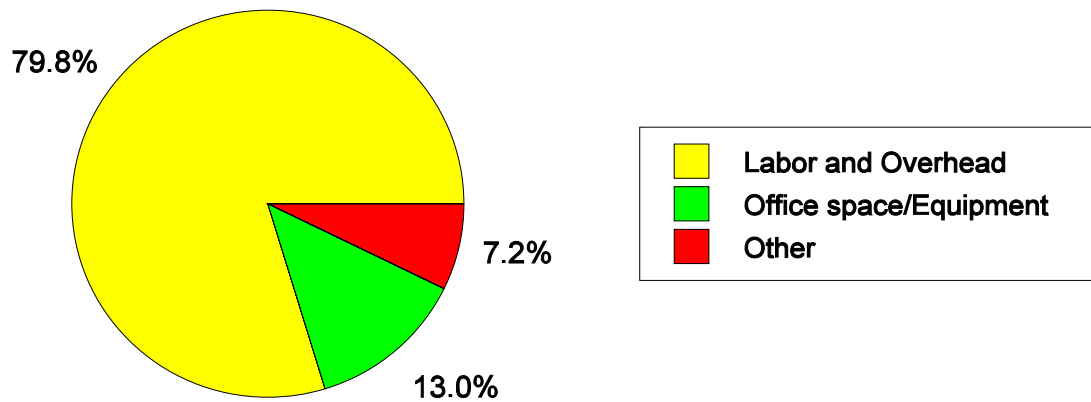
Exhibit 5-5

Vendor Design and Development Costs (2000 Dollars)

	Citicorp EFS	CACI	SVS	Total
Labor	$207,703	$1,256,405	$448,879	$1,912,987
Telecommunications	$3,590	$38,497	$0	$42,087
Travel/Vehicle leases	$3,391	$18,579	$1,342	$23,312
Office space/Equipment	$63,024	$250,036	$0	$313,060
Stationery and supplies	$46,046	$22,966	$0	$69,012
Miscellaneous	$9,195	$29,804	$329	$39,327
Total costs	**$332,948**	**$1,616,288**	**$450,549**	**$2,399,785**
Total person-years	1.2	13.5	6.8	21.5

All costs have been inflated by 6.3 percent to adjust from 1996-1997 to 2000 dollars.

As shown in Exhibit 5-6, about 80 percent of vendor design and development costs were for labor and overhead. Office space and equipment costs, chiefly for CACI, accounted for 13 percent of vendor costs for this phase.

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4 A comparison of Citicorp EFS' revenues to its costs was not undertaken because the revenues were for only a portion of the work completed during the design and development phase. In particular, system modifications and preparations for implementation were not formal deliverables for which ODJFS explicitly paid Citicorp EFS. For similar reasons, analysis of subcontractor revenues versus costs was not pursued.

Exhibit 5-6

Vendor Design and Development Costs, by Cost Category

Total Vendor Implementation Costs

Citicorp EFS and CACI incurred a total of $8.7 million in reported costs for implementation, as shown in Exhibit 5-7. Of this total, $6.3 million was labor and overhead costs. The largest portion of the labor and overhead cost, $3.9 million, was for retailer roll-out activities; the second-largest portion, $2.2 million, was for project management. As shown in Exhibit 5-8, labor and overhead represented 73 percent of vendor implementation costs. Other major vendor implementation costs included retailer supplies, travel and vehicle leases, and office space and equipment. As the firm directly responsible for signing up, equipping and training food retailers, CACI incurred the vast majority of implementation costs, $7.6 million.[5] The vendor implementation costs exclude expenses that were purely operational in nature, such as POS maintenance, and a share of project management attributable to operational oversight.[6]

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5   As noted earlier, all reported SVS costs during the implementation period were operational in nature.

6   See Appendix A for an explanation of how vendor operations costs during implementation were identified.

Exhibit 5-7

Vendor Implementation Costs

	Adjusted Costs in Year 2000 Dollars		
	Citicorp EFS	**CACI**	**Total**
Labor and overhead			
Retailer rollout		$3,873,398	$3,873,398
County rollout		$237,338	$237,338
Project management	$564,953	$1,625,939	$2,190,892
Labor and overhead subtotal	**$564,953**	**$5,736,675**	**$6,301,628**
Telecommunications	$2,649	$157,145	$159,795
Retailer supplies	$6,718	$584,376	$591,094
Travel/Vehicle leases	$29,147	$591,441	$620,587
Office space/Equipment	$271,085	$451,782	$722,867
Printing and duplicating	$128,051	$22,008	$150,059
Miscellaneous	$55,242	$78,817	$134,059
Total implementation costs	**$1,057,844**	**$7,622,245**	**$8,680,089**
Total person-years	3.6	83.3	86.9

These costs have been adjusted by the following inflation factors: Citicorp EFS, 3.4 percent; CACI, 2.6 percent.

Exhibit 5-8

Vendor Implementation Costs, by Cost Category
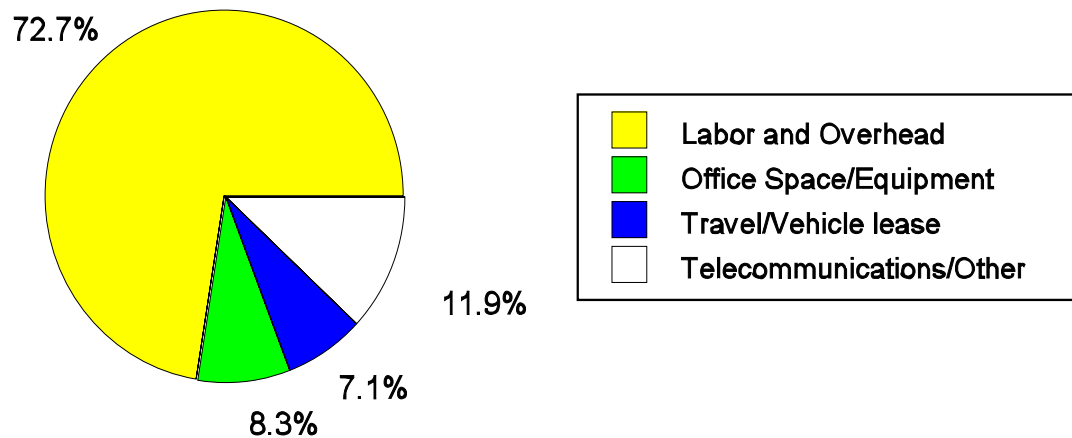
Role of Vendors and Associated Costs

Citicorp EFS

As prime contractor for the project, Citicorp EFS managed the overall contract, provided liaison with ODJFS, and oversaw the work of CACI and SVS.

Citicorp EFS reported about $333,000 in **design and development** costs. Over half of this total represents labor and overhead costs associated with the two Citicorp EFS staff assigned to the project, the project director and the assistant project director. Total design and development-related labor for Citicorp EFS was 1.2 person-years.

Citicorp EFS established an office in Columbus, Ohio to house its EBT project staff. As a result, the main non-labor costs were office space and equipment, and stationery and supplies (see Exhibit 5-6).

Citicorp EFS reported $1.0 million in **implementation** costs. About 53 percent of this total represents labor and overhead costs associated with the Citicorp EFS project director and assistant project director. The main non-labor costs were office space and equipment, printing and duplicating, and other miscellaneous charges.

CACI

CACI was involved in many tasks during the design and development phase. In particular, CACI was responsible for the following activities: developing procedures for contacting retailers and

executing agreements with them, developing procedures for equipping retailers with EBT equipment and training them on use of the equipment, and evaluating the Retailer Training Manual, the County Training Manual, and the Implementation Plan.

The largest portion of CACI's effort for design and development was devoted to developing a system for site surveys and establishing equipment installation and maintenance systems. These tasks required the development and documentation of all the technical and procedural steps to support the installation and maintenance of EBT equipment. In addition, the development of the training modules for retailers and counties accounted for a large portion of labor resources. Finally, the process of planning for implementation required job-stream analysis to determine what needed to be accomplished, and how quickly.

CACI reported $1.6 million in **design and development** costs, including $1.2 million in labor and overhead expenses. CACI's labor costs are associated with 18 staff people who spent a total of 13.5 person-years of effort. The primary non-labor costs were for office space and equipment, supplies, and telecommunications. Telecommunications costs included establishing and equipping a telephone center in preparation for the implementation phase.

CACI's design and development costs—representing two-thirds of the EBT vendor team's costs—are relatively high in part because CACI had not previously undertaken an EBT equipment roll-out on the scale of the Ohio project. Indeed, no firm had previously undertaken the challenge of equipping all FSP retailers in a large state, because elsewhere the large retailers have integrated EBT with existing POS systems.

During implementation, CACI was primarily responsible for all contacts with retailers, including initial visits, sign-up, equipment installation and servicing, and training; and contact with each CDJFS office, including installation and servicing of CMS and POS equipment, training of workers in each operational area, and supplying card inventory.

CACI reported $7.6 million in **implementation** costs, including $5.7 million in labor and overhead expenses. CACI's labor expenses are associated with staff spending a total of 76.9 person years over the implementation period. About 68 percent of CACI's labor cost was for retailer roll-out, and 28 percent was for project management. Only 4 percent was for county roll-out (including equipment installation and training). The primary non-labor costs were for travel, office space and equipment, and telecommunications. CACI's costs represent 88 percent of the EBT vendor team's implementation cost.[7]

Stored Value Systems
SVS was responsible for completing the technical work required to revise the off-line EBT system for statewide expansion. Key areas of responsibility during design and development included:

- Drafting the Detailed System Design Document;

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7   CACI used a subcontractor for a portion of the retailer installations. The subcontractor effort is included in CACI's reported labor.

- Enhancing the security of the system;
- Refining card, terminal, and host system software; and
- Acceptance test planning, execution, and reporting.

SVS reported about $451,000 in **design and development** costs, almost all of which was labor and overhead costs. SVS' labor costs are associated with 17 staff people who spent 6.8 person-years on design and development. As discussed earlier, the SVS costs do not include the design and development of the original FSP off-line EBT system used in the Dayton pilot, which provided the foundation for the Direction Card system.

SVS' role during implementation mainly consisted of maintaining system operations at the host processing site and the customer service hotline. There were aspects of this role, such as adding retailers to the system database and responding to the questions of recipients new to the EBT system, that may have been more resource-intensive during implementation than afterward. Nevertheless, the reported costs for SVS did not identify any such incremental costs for implementation.

5.5   County Design, Development and Implementation Costs

County Design and Development Costs

Most counties did not incur costs during the design and development phase of the expansion of the off-line EBT system in Ohio. The six CDJFS that participated on the County Advisory Board, however, incurred expenses related to the participation of county staff on the board. The members observed a demonstration of the pilot system in Montgomery County in July 1996 and met with ODJFS and vendors to discuss the planned system design in August 1996. Each of these meetings lasted approximately one-half day. The total county costs associated with activities of this committee are estimated at about $4,000.[8] The total labor commitment was approximately 0.04 person-years.

County Implementation Costs

Implementation Process for County Departments of Jobs and Family Services
On January 1, 1997, the Citicorp EFS team converted the accounts of food stamp recipients in Dayton using the PayEase system to the Direction Card System. This conversion required no intervention by the Montgomery CDJFS, except for the replacement of obsolete EBT cards issued at the beginning of the pilot period. EBT staff at MCDJFS required minimal training because of their familiarity with the PayEase system.

The first step in expanding the system was to convert the remaining food stamp recipients in Montgomery County to EBT. In August 1997, MCDJFS began this process, and the first recipients outside the pilot area began receiving benefits through the EBT system in September 1997. All food stamp recipients in Montgomery County were converted to EBT by January 1, 1998, five months after county expansion began.

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8   The estimate is based on six members with a typical salary of $48,000 plus 53 percent fringe, each spending a total of 12 hours on committee-related activities. (The fringe rate includes pay for all types of leave as well as outlays for benefits and payroll taxes in addition to salary.) Overhead is included as previously described.

In the other counties, which had no prior EBT experience, implementation activities followed a somewhat different pattern. Implementation efforts typically began with an ODJFS representative giving the county a brief overview of the new system and discussing plans for conversion to EBT. This visit was typically followed by several visits from CACI. The purposes of the visits were to perform an initial site overview, to install the EBT equipment, to train staff, and (shortly prior to the start of recipient conversion) to verify that Direction Card staff were prepared for EBT and help answer any remaining questions.

The main preparatory activities for county staff were determining a plan and schedule for training and issuance, notifying recipients of the upcoming conversion, and training all staff who would be involved in the conversion effort. As part of the planning efforts, county staff often visited other counties who had already begun implementation.

After recipient conversion began, in addition to training the recipients and issuing cards, county staff kept track of who had already been converted and sent additional notices to those recipients who did not show up for their scheduled training. Eventually, at the end of their implementation periods, counties switched any remaining recipients not already converted onto the Direction Card system by changing their issuance mode to "EBT" in the CRIS-E eligibility system. These recipients then had to get Direction Cards to pick up their benefits.

Estimates of County Implementation Costs

Exhibit 5-9 shows estimated levels of effort,[9] total costs and average costs per case for county implementation activities in Ohio. The estimated statewide cost of county implementation efforts was $7.7 million, or $29.20 per case. The average level of effort was 8.30 person-months for every 1,000 cases; the total statewide effort by county staff was 183.4 person-years.

Exhibit 5-9

County Implementation Costs and Levels of Effort, by County Group

County Groups	Adjusted Costs in Year 2000 Dollars[a]		Level of Effort
	Total Cost	Total Cost/Case	Total Labor per 1,000 Cases (Person-Months)[b]
Small counties	$3,783,039	$31.96	10.77
Montgomery County expansion	$83,609	$9.92	3.93
Cuyahoga County	$1,630,420	$41.72	8.73
Other large counties	$2,247,706	$22.62	6.38
Statewide	**$7,744,773**	**$29.20**	**8.30**

a   The costs were adjusted by an inflation factor of 2.1 percent.
b   Cuyahoga level of effort represents county staff and estimated contractor staff.

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9   Level of effort includes the planning period unless planning was a gradual effort over a long period of time.

In the exhibit, separate cost and effort estimates are provided for the Montgomery County expansion, Cuyahoga County (Cleveland), other large counties (with 10,000 or more cases), and the small counties (with less than 10,000 cases). The figures for Montgomery and Cuyahoga Counties are not averaged with those of the other large counties because of unique situations. As noted earlier, the Montgomery County process was unique because it was an expansion of an existing operation. Cuyahoga County also had a unique process, both because it had the largest caseload and, more importantly, because it was the only county to use a contractor to train recipients (as discussed elsewhere in this report).[10] The estimates for the other large counties are weighted averages based on the data from the other two large counties in the implementation interview sample, Franklin and Lucas Counties. The small county estimates are weighted averages based on the data from the six small counties in the sample.[11]

Under Ohio's county-administered system, each CDJFS had the autonomy and the responsibility to decide how to integrate EBT implementation and operations into its existing business processes. The variety of organizational structures, staffing levels, facilities and other factors required adaptation of the basic plan for EBT implementation in each county. For this reason, more resources were devoted to local-level planning for EBT implementation than would typically be used in a more centralized, state-administered setting.

How Size and Implementation Start Date Affected Implementation Costs

As Exhibit 5-9 indicates, the small counties as a group had above-average implementation costs per case: their average was $31.96 per case, whereas the statewide average was $29.20 per case. The relationship between county size and implementation cost per case is further illustrated by the chart in Exhibit 5-10. This relationship is likely due to economies of scale. In larger counties, staff can train larger groups of recipients in the same amount of time as smaller groups, and there is often less downtime for card issuance staff. The effort for planning and training staff for implementation was a larger portion of the total cost in smaller counties.

Other factors also influenced the variation of the implementation cost per case. The two counties in the sample with the lowest cost per case were Montgomery County and Clark County (one of the small counties). Montgomery County's cost was so low because it already had experience from the pilot. Clark County's cost was low in part because the staff who converted the recipients were all non-supervisory, with relatively low salaries, whereas many counties used supervisory staff to train recipients or to provide back-up for card issuance.[12] Other than these two counties, the minimum cost for implementation was slightly over $20 per case (see Exhibit 5-10).

As can be noted, Cuyahoga County, the largest county in Ohio, also had a relatively high cost per case. This county operated on a decentralized basis, with multiple offices serving sections of the

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10   ODJFS strongly discouraged Cuyahoga County from using a contractor for recipient training because of the anticipated cost. It is rare for a county to contract on its own for recipient conversion assistance.

11   See Appendix A for a description of the procedures used to weight the sample county data.

12   Clark County did not provide separate estimates of planning or staff training costs, so these costs may be understated in the sample data.

county. Each of these offices acted somewhat as a smaller county office, reducing the economies of scale.

Counties that implemented later might have been able to reduce their costs using lessons learned from earlier implementing counties, but this did not appear to happen in Ohio. As Exhibit 5-11 shows, there was little relationship in the sample between the date of implementation and the implementation cost per case. The later counties in fact had a higher median cost per case and a wider range. These differences presumably reflect factors other than the timing of implementation, including the very small caseloads of the last two counties to implement.

5.6   State Design, Development, and Implementation Costs

State Design and Development Costs

ODJFS directly incurred a reported total of approximately $110,000 in design and development costs for its own activities during the phase, as shown in Exhibit 5-12. These costs were incurred in the following design and development activities: review of and comment on the Detailed System Design Document, the Acceptance Test Plan, the Acceptance Test Report, the Implementation Plan, the Risk Analysis Report, and manuals and training materials; development of the Implementation Advanced Planning Document (IAPD); software development for CRIS-E; meeting with the Ohio Grocers' Association for recruitment of retailers; and conducting the acceptance test. The bulk of these costs, about $107,000, were direct labor costs associated with the three ODJFS staff members spending a total of 0.9 person-years working on the EBT project. The balance of ODJFS' direct costs included travel and miscellaneous items.[13]

State Implementation Costs

ODJFS directly incurred a total of about $587,000 in reported implementation costs for its own activities during the phase, as shown in Exhibit 5-13. These costs were incurred on the following implementation activities: support and oversight for county implementation activities, vendor oversight, and technical support for the CRIS-E/Direction Card systems interface. State EBT team members, either ODJFS or contract technical support staff, visited each of the state's 88 counties several times, including planning, staff training, and support during the start of recipient conversion. Technical support staff also monitored the conversion process, addressed technical issues with the CRIS-E/Direction Card systems interface, and produced data extracts for county use in conversion scheduling. The major components of the ODJFS implementation costs were approximately $366,000 in ODJFS labor and $185,000 in contract labor costs. The total level of effort over the implementation period was 7.4 person-years. The balance of ODJFS' direct costs were for travel and miscellaneous items.

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13   Technical support staff under contract to ODJFS for CRIS-E system modifications provided assistance to the ODJFS EBT staff during the design phase, but the cost of these activities was not available. The reported ODJFS cost also excludes overtime for exempt staff.
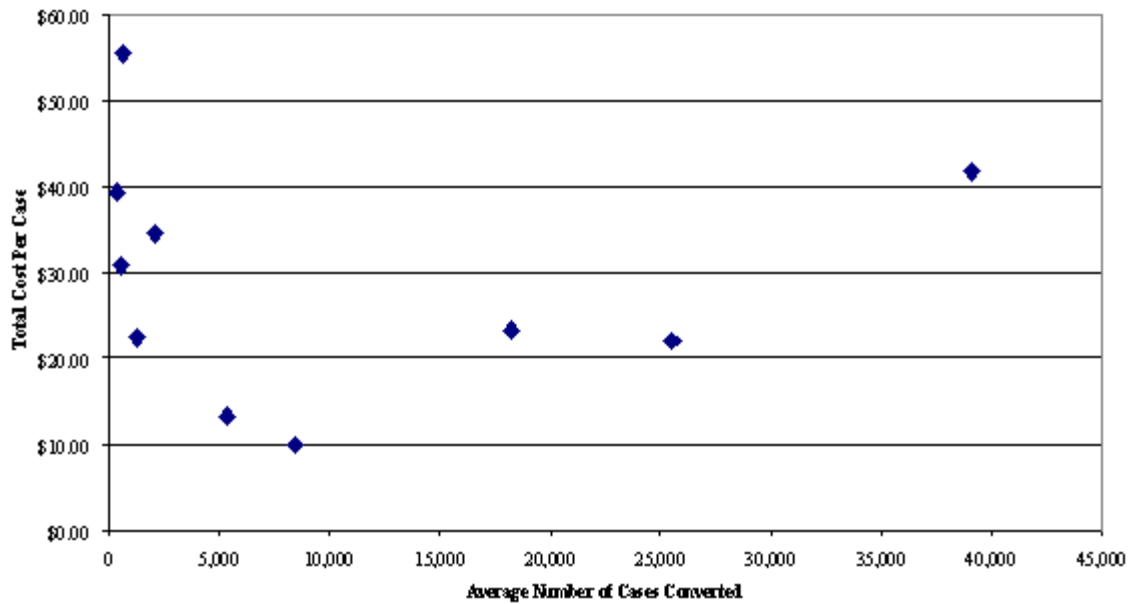
Exhibit 5-10

Relationship of Ohio Direction Card Implementation Costs for Sample Counties to Number of Cases Converted

Exhibit 5-11

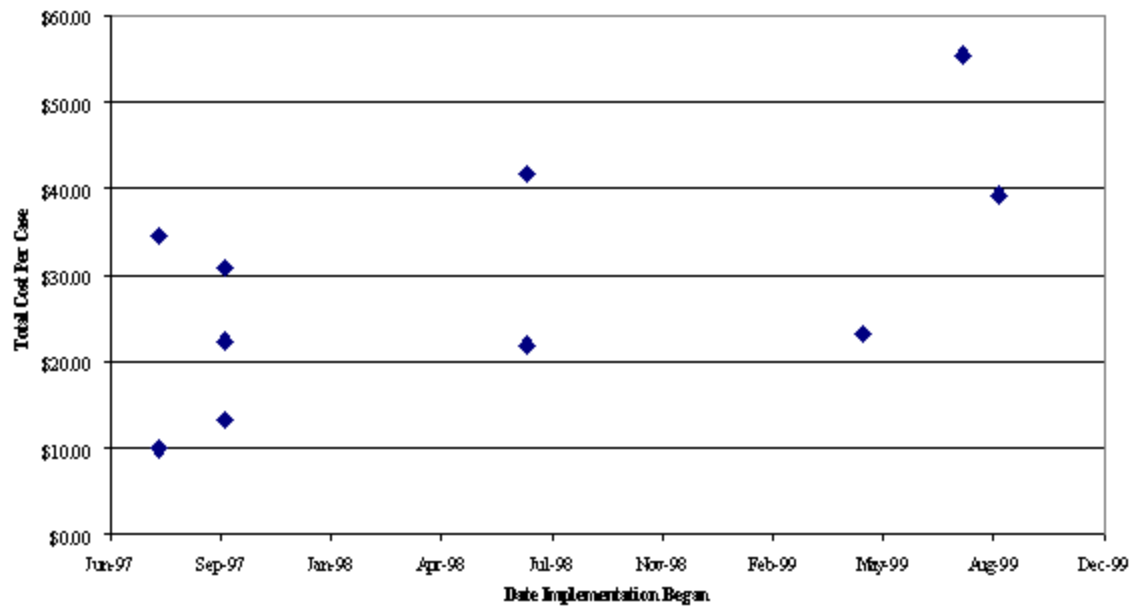**Relationship of Ohio Direction Card Implementation Costs for Sample Counties to Implementation Start Date**

Exhibit 5-12

ODJFS Design and Development Costs

	Total (2000 Dollars)[a]
ODJFS Labor	$107,116
Travel	$2,303
Miscellaneous	$130
Total Design and Development Costs	$109,550
Total person-years	0.9

a   These costs were adjusted by an inflation factor of 6.3 percent.

Exhibit 5-13

ODJFS Implementation Costs

	Adjusted Total Costs in Year 2000 Dollars[a]
ODJFS labor	$366,070
Contract labor	$184,657
Travel	$32,365
Miscellaneous[b]	$3,695
Total implementation costs	**$586,786**
Total person-years	7.4

a   These costs do not include operational activity during implementation. These costs were adjusted using an inflation factor of 3.0 percent.

b   Data processing costs for implementation (i.e. ACO/FCO CRIS-E usage for setting up cases on EBT System) were not available.

5.7   Comparison of Design, Development, and Implementation Costs to the Dayton Pilot

Design and Development Costs

As stated previously, this evaluation estimates the design and development costs for the statewide Direction Card system to be $2.5 million. This is roughly comparable to the $2.2 million (in 2000 dollars) incurred by the State, Montgomery County, and the EBT vendor for the design and development of the off-line EBT pilot in Dayton. The two estimates are, however, based on different types of cost data and cover different sets of activities, as explained below.[14]

The costs to design and develop the pilot system represent the creation of the off-line system from the ground up, whereas, to a great degree, Ohio's statewide system was built upon the pilot system and the off-line EBT system in Wyoming. In this respect, we would expect the design and development costs of the statewide expansion to be lower than those for the pilot system. SVS' costs of $451,000 for the design and development of the Direction Card system were, in fact, only a fraction of the almost $2.0 million (in 2000 dollars) incurred by NPC for the design and development of the pilot off-line EBT system. The statewide design and development costs, however, include the costs to put into place the systems, procedures, and infrastructure necessary for a multi-year roll-out involving all 88 counties in Ohio. The pilot system, on the other hand, involved the conversion of less than one full county from paper food stamps to off-line EBT.

The start-up costs for the Ohio statewide EBT system were quite a bit higher than the $1.5 million in design and development costs estimated for the off-line PayWest EBT system in Wyoming.[15] Although the Wyoming system also built directly on the Dayton pilot project, most design and development costs were related to adding the WIC program to the system. The WIC program is fundamentally different from the FSP or cash-based assistance programs, in that the benefits are issued as a prescription for specific foods. Like the Dayton pilot, the Wyoming system was originally implemented on a very small scale and did not require the extensive implementation planning effort required by statewide roll-out in Ohio.

In a sense, the full set of State and vendor resources invested in the design and development of the Direction Card system includes a portion of the $2.2 million design and development cost for the Dayton pilot, plus a portion of the $1.5 million in design and development costs for the Wyoming project, as well as the $2.5 million spent by ODJFS and the Citicorp EFS team. There has been a great deal of repetition, however, in documentation, testing, implementation, and other activities that did not directly contribute to the current generation of off-line EBT technology. Thus, another State and vendor starting from scratch would probably spend more than $2.4 million to achieve the same

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14   Glickman *et al.*, *op. cit.* The original cost of $2.3 million, incurred from 1990 to 1994, has been adjusted for inflation, and FNS' share ($0.5 million in 2000 dollars) has been excluded for purposes of comparison. For the pilot project, all parties reported their actual costs, except for unbilled overtime spent by vendor personnel.

15   P. Elwood et al., "Issues on Planning Off-line EBT for the WIC and Food Stamps Programs: Interim Evaluation of the Wyoming Smartcard Demonstration", Project Officer: J. Kresge. U.S. Department of Agriculture, Food and Nutrition Service, Office of Analysis, Nutrition and Evaluation, Alexandria, VA, 1996.

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result, but certainly much less than the combined $5.8 million cost of design and development for the three projects.

When it was implemented, the Direction Card system served only the FSP, so all of the design and development costs are attributed to the FSP. ODJFS and the Ohio Department of Health subsequently contracted with the Citicorp EFS team to design, develop and pilot-test a modified EBT system to deliver WIC benefits as well as food stamp benefits. The WIC portion of this system was implemented on a pilot basis in October 2000.[16] With some modification, the Direction Card system also has the capability to deliver cash assistance benefits for the TANF program. Thus, a portion of Direction Card system design and development costs has already benefitted the WIC program, and these expenditures may in the future benefit the TANF program as well.

Implementation Costs

For comparison of implementation costs to the pilot, we examined the CDJFS costs per case, but we did not attempt to compare the vendor and State costs for implementing a system over 88 counties with the cost of implementing the system in the pilot site. In addition to the difference in scale, the extra attention devoted to the first-time use of off-line EBT makes it inappropriate to compare the State and vendor costs for pilot implementation with those of the statewide Direction Card system.

We compared the statewide average county EBT implementation cost per case for the Direction Card to the cost per case of converting the original Dayton pilot population and to the cost per case of converting the remaining Montgomery County population.[17] As can be seen in Exhibit 5-14, the average county EBT implementation cost of $29.20 per case was significantly lower than the Dayton pilot conversion cost of $63.11 per case. Part of this difference is due to the fact that for the conversion of the Dayton pilot population, building space needed to be leased. The cost of this space translated to $11.10 per case. Additionally, it should be expected that the cost of implementation for a pilot site would be higher than the cost of implementation for later sites. Pilot sites are subject to greater scrutiny and must confront more unexpected problems than sites that implement a more mature system with the benefit of experience from the pilot. Additionally, the vast majority of the planning, recipient training and card issuance for the Dayton pilot was done by a subcontractor, which may also have led to a higher cost.

On the other hand, the cost of converting the remaining Montgomery County population was only $9.92 per case, significantly lower than the average county EBT implementation cost. The prior experience of MCDJFS with implementing and operating the pilot EBT system enabled the front-line staff to complete the EBT conversion at a lower cost. Management costs were relatively low as well, because of the experience of the staff and the continuity of the management.

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16   In March 2001, ODJFS and the vendor team implemented the modified FSP system with support for a dual WIC/FSP EBT card for the pilot.

17   All costs presented are in FY2000 dollars. Dayton pilot costs were inflated by 16.0 percent from 1992 dollars to 2000 dollars using the GDP implicit price deflator.

Exhibit 5-14

Comparison of County EBT Implementation Costs per Case for Statewide Ohio Direction Card, Dayton Pilot, and Montgomery County Direction Card

	Adjusted Costs in Year 2000 Dollars		
	Overall Ohio Direction Card (265,228 Cases Converted in 31 Months, 1997 to 2000)	**Montgomery County Ohio Direction Card (8615 Cases Converted in 16 Months, 1997 to 1998)**	**Dayton Pilot Population (10,500 Cases Converted in 5 Months, 1992)**
Labor	$19.35	$6.91	$3.74
Other direct costs[a] (including building renovations and contract costs)	$2.68	N/A	$15.20
Overhead	$7.17	$3.02	N/A
Subcontractor	N/A	N/A	$44.17
Total	**$29.20**	**$9.92**	**$63.11**

N/A = not applicable.

a   Includes building renovations and contract costs for Ohio Direction Card; includes travel, space lease and other direct costs for Dayton Pilot.

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Ohio Department of Human Services, "Food Stamp Electronic Benefits Transfer System RFP", Columbus, OH, 1994.

Appendix A
Data Sources and Methods for Analysis of Design, Development, and Implementation Costs

This appendix presents information on the sources of data and analysis methods used to estimate the costs of designing, developing and implementing the Ohio Direction Card system. In the sections that follow, information is provided on the data sources and methods for vendor, county and state costs.

As discussed below, the implementation costs do not include operational costs incurred during the three-year implementation period, except for county costs to resolve problems during each county's implementation period. The design, development, and implementation costs also exclude the expenses for the PayEase pilot EBT system in Montgomery County.

All design, development, and implementation costs have been adjusted for inflation to year 2000 dollars using the implicit price deflator for the Gross Domestic Product (GDP). Ohio Direction Card design and development costs have been adjusted using the applicable GDP price deflator multiplier for 1996. Implementation costs have been adjusted for inflation using a weighted average of the applicable GDP price deflator multipliers throughout the implementation period (1997 to 2000). The cost per case for the Ohio Direction Card system is calculated based on an estimated average state-wide caseload of 265,228 during the implementation phase.

Vendor Design, Development, and Implementation Costs

Sources of Data

The data sources for the analysis of vendor design, development and implementation costs included vendor interviews, special financial reports prepared for the evaluation, and system operating statistics. These sources are described below.

Vendor Interviews
The researchers conducted three rounds of vendor interviews on the design, development, and implementation process. In January to March 1997, vendor staff were interviewed about the major activities during the design and development phase, including system design, development, testing, and planning for implementation. Interviews on implementation activities with the vendor team were conducted in April 1998 and October 1999. The key topics discussed include the main vendor activities associated with the following:

- Working with counties to help implement off-line EBT;
- Providing ongoing support to counties during the implementation;
- Working with retailers to implement off-line EBT;
- Resolving ongoing issues with retailers during implementation; and
- Resolving ongoing issues with ODJFS during implementation.

These interviews did not cover the costs of implementation but provided a context for interpreting the costs.

Documents Reviewed

The primary source of data used in the analysis of vendor design, development and implementation costs was the financial reporting information for Citicorp EFS, SVS, and CACI. Citicorp EFS provided the researchers this information on a monthly basis from July 1996 through December 1999. Additionally, monthly reports on system operating statistics were provided by SVS and Ohio retailer counts were provided by Citicorp EFS. These data were used in the analysis as described below.

Citicorp EFS reported its actual costs. For SVS and CACI, the costs were reported on the basis of billings to Citicorp EFS, but information on expected or actual resource use was reflected in the distribution of costs across reporting categories.[1] The vendors' cost reports followed a standardized format developed by Abt Associates that provided line-item detail for labor (including fringe), tele-communications, travel, office space and equipment, supplies, miscellaneous, administrative termi-nals, retailer supplies, and indirect costs (including overhead and administration).[2]

Although the period from July 1996 through April 1997 is defined as the design and development phase, some vendor resources were spent on implementation and operations activities during this period. For the evaluation, the three vendor firms provided information about the allocation of staff time among three functional categories: design and development, implementation, and operations. These reports not only provided information for the allocation of costs but also provided information about the level of staff effort on the project during the period.

During the period from May 1997 through December 1999, Citicorp EFS and CACI reported the amount of staff time spent on each of the following categories: retailer rollout/POS installation, CDJFS equipment setup/staff training, recipient and CDJFS hotline, retailer hotline/POS mainte-nance, and project management/other. All of Citicorp EFS's time was reported in the project management/other category, but the CACI data permitted the separation of labor costs between implementation, operations and shared project management.

Analysis of Vendor Implementation Costs

The researchers compiled and analyzed vendor cost data to separate true implementation costs from system operations during the implementation phase. A cost was assigned to the implementation category if it was a one-time cost and related either to implementation, to problems left over after conversion from the PayEase system to the Direction Card system, or to the Year 2000 problem

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1   The SVS cost reports were based on expected resource costs for operations. As a result, SVS had no reported costs for system fixes other than the expected level of maintenance, and all of SVS' costs during this phase were considered operational in nature.

2   The SVS cost report for the design and development phase did not include fringe in its labor costs and did not provide overhead costs. We adjusted SVS' labor and overhead costs based on fringe and overhead multipliers used by NPC before NPC formed SVS.

(Y2K).[3] A cost was considered purely operational in nature if it was recurring or related to fixes to problems identified after the start of live operations.[4] The remaining costs that could not be directly assigned were general management, facilities and support expenses.

For Citicorp EFS costs during the implementation phase that could not be directly assigned to implementation or operations, the split between these categories was computed on a monthly basis, with the operational share equal to the percentage of the caseload that was converted. This analysis did not attempt to allocate a share of the cost of card management systems (CMS) for implementation because this cost was a minimal portion of the total equipment cost for the phase.

For CACI costs during implementation phase that could not be directly assigned to implementation or operations, the portion allocated to implementation was equal to the portion of directly assigned labor costs that was expended on implementation.

The vendor implementation costs presented in this report include Citicorp EFS and CACI costs, but not costs for SVS. All of SVS' reported costs during this phase were considered operational in nature. SVS' role during implementation was to operate the host computer and the customer service center, and to resolve technical problems with the system software. The SVS cost reports were based on expected resource costs for these operational activities. As a result, SVS had no reported costs for Y2K testing or for fixes to system problems that were left over from the conversion to the Direction Card system, other than the routine system maintenance assumed in the expected resource costs.

County Design, Development, and Implementation Costs

Sources of Data

Costs for design, development and implementation activities involving the County Departments of Jobs and Family Services (CDJFS) in Ohio were primarily obtained from interviews with key personnel in a sample of CDJFS. Additional data on these costs were obtained from state cost accounting sources.

County Interviews
The researchers conducted on-site implementation interviews with EBT and other staff in ten CDJFS offices after implementation processes were well-established, but in some counties the caseload was not yet fully converted. Follow-up telephone interviews were conducted as necessary, after implementation was completed to collect final cost information. In-person interviews were conducted in

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3   The Year 2000 problem (Y2K, Millennium Bug) came about due to programming practices involving the use of six-digit dates (dd/mm/yy) vs. eight- digit dates (dd/mm/yyyy). This results in the possibility of a date such as 12/1/31 being misinterpreted (is it 1931 or 2031?). Thus, any computer program that deals with six-digit dates is susceptible to the Y2K problem. The additional work necessary in 1999 to avoid problems related to Y2K beginning on January 1, 2000 was considered a one-time effort to resolve an outstanding issue from the design and development phase, so the cost of this work was counted as part of implementation.

4   One might argue that costs associated with fixing problems should be part of implementation costs, on the basis that all problems will eventually be fixed, and these costs will not recur. Experience with other EBT systems, however, suggests that these systems are constantly evolving and upgrading. The "extra" costs appear to be more or less constant over time, with workload responding to available resources rather than the reverse.

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two phases. Early implementation interviews were conducted with five counties in March 1998. Late implementation interviews were conducted with five additional counties during July 1999, March 2000, and July 2000. The goals of the visits included documenting how the counties were performing their roles in EBT implementation, what challenges they encountered, and what lessons they learned that would benefit other counties in future EBT projects. Additionally, respondents identified the staff time and other county resources used to perform EBT functions.

At each county office, interviews involved the following types of staff:

- Supervisors (who discussed who their key people were and how they allocated their time);

- Primary staff involved in planning for implementation;

- Lead staff members responsible for recipient training, card issuance, trouble-shooting Direction Cards and related benefit delivery issues, food stamp coupon implementation, and reporting;

- Income Maintenance staff;

- Other senior fiscal or support unit officials with significant responsibilities related to EBT implementation; and

- The people most knowledgeable about the costs incurred by the county for EBT implementation, particularly costs not covered by ODJFS cost reports.

The counties where implementation interviews were conducted are listed below:

Early Implementation Interviews				Late Implementation Interviews			
County	Average Caseload During Implemen-tation	Region of Ohio	Date Visited	County	Average Caseload During Implemen-tation	Region of Ohio	Date Visited
Clark	5,407	Southwest	3/98	Auglaize	370	Northwest	3/00
Greene	2,083	Southwest	3/98	Cuyahoga[a]	39,084	Northeast	7/99
Miami	1,233	Southwest	3/98	Franklin[a]	25,552	Central	7/99
Montgomery[a]	8,425	Southwest	3/98	Lucas[a]	18,199	Northwest	3/00
Preble[a]	559	Southwest	3/98	Morgan[a]	610	Southeast	7/00

a   Counties in the operations interview sample.

In selecting the ten CDJFS for the implementation interviews, the following criteria were considered:

- The sample represented both large and small counties, because of the significant differences in staffing and organization between these types of counties.

- The sample represented the geographic diversity of Ohio, reflecting the different regions of the state and the mix of urban and rural areas.

- The sample included counties with implementation dates spread over the period from August 1997 through August 1999.

- For comparisons to the pilot data, the sample needed to include Montgomery County (Dayton).

The selection of counties for the early implementation interviews, however, was driven primarily by timing, namely, the need to conduct interviews in March 1998 for the evaluation's interim report. Montgomery County was chosen because it was the pilot site. Four other counties were selected out of the seven remaining counties that had their implementation processes well-established by March 1998. The selection of Clark, Greene, Miami, and Preble Counties was intended to represent a reasonable mix of caseload size.

The selection of the remaining five counties for the late implementation interviews was intended to assure that the overall sample had balanced representation of large and small counties in different regions. The sampling was also driven by the need to gather data shortly after respondents had completed their involvement in the implementation process, so that they could provide accurate accounts of events, problems and the level of effort.

Cuyahoga and Franklin Counties were chosen to be included in the late implementation interview sample because they have the largest CDJFS offices in the state. Lucas County was the last county with over 10,000 FSP cases to complete implementation, and it helped represent the northwest region of the state. To balance out the sample, implementation interviews were conducted in one small county in the northwest region (Auglaize) and one county in the southeast region (Morgan).

Documents Reviewed
ODJFS provided data from the Income Maintenance Random Moment Sample time study of CDJFS staff during the implementation phase. Coverage of EBT activities in this time study during implementation was highly variable, however, with numerous counties having no identified EBT costs during this phase. Interviews with the CDJFS in the study's implementation sample confirmed that the time study data did not provide a reliable measure of EBT costs because of problems with the coverage of staff by the study and the identification of EBT-related activities. None of the sample counties had comprehensive records of EBT implementation costs that could be used for the evaluation.

As a result, the evaluation relied on the interview data as the best available source for county implementation costs. The interviews used a consistent framework of implementation tasks to ensure comprehensive estimates and comparability across sites. The CDJFS respondents took considerable care in formulating their responses, using staffing patterns and work schedules as the basis for estimating staff time spent on implementation. When a CDJFS reported extremely high or low values

(relative to the other counties on a per-recipient basis), the researchers asked the respondent to confirm the response and clarify why the values were exceptional. The use of interview data to estimate local office implementation costs is consistent with the approach used in the Dayton, Ohio and Wyoming demonstration studies.

Analysis of Implementation Costs for Sample Counties

Based on the data from the interviews in each of the ten sample counties, the researchers summarized the costs of activities during the implementation period as well as the level of effort. County implementation costs include all implementation activities (i.e., planning, staff training, recipient training, and card issuance), as well as operations activities which took place during each county's implementation period (i.e., troubleshooting problems with the cards, unlocking cards, and replacing cards).[5] Implementation costs include labor costs, other direct costs (ODCs), and overhead costs. ODCs include the cost of renovations necessary to prepare the offices for conversion to EBT and Cuyahoga County's contract for recipient training and issuance. All other costs such as mailings, furniture, and other supplies are assumed to be included in overhead costs.

To impute overhead costs for county activities, the analysis used county cost allocation data. Income maintenance costs charged to each program include not only the direct salary and benefit costs for staff time but also a proportionate share of supervisory staff and non-labor costs. Thus, we were able to derive an appropriate overhead rate for each county in the sample. This method required careful review of the interview data from the county sample to determine the appropriate handling of indirect costs for each county. The direct labor costs estimated for each county included time for income maintenance staff and other staff performing direct EBT implementation functions. The time spent on general supervision and other overhead functions was excluded from direct EBT implementation labor, because this time was assumed to be included in the overhead costs.

Analysis of Statewide County Implementation Costs

After computing labor, other direct, and overhead costs for each of the sample counties, weights were assigned to these counties for the estimation of statewide county implementation costs. To calculate the weights, we treated the counties as a stratified random sample, with probability proportional to size. The weight of an observation for this scenario is equal to $M/(n*m)$, where M = total measure of size (caseload) for the stratum, n = number of sampled counties, and m = measure of size (caseload) for the county. The caseloads used in calculating the implementation weights were as of April 2000, the caseloads at the time of "sampling" for the final interviews (around April 2000). Although technically this is post-weighting, it means that the weighted results better reflect the statewide averages for the period in question.

For the implementation estimates, the state was divided into four strata: small counties (counties with fewer than 10,000 cases as of April 1997), large counties (counties with more than 10,000 cases as of April 1997), and Montgomery and Cuyahoga Counties, which were each treated as separate strata. Because Montgomery County was not beginning implementation from scratch, but expanding on the pilot, it was treated as self-representing. Similarly, because Cuyahoga has a significantly larger

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5   There is no way to isolate (or exclude) costs associated with these operations activities at the county level.

caseload than the other counties, and because it alone used a significant amount of contracted labor, it was also self-representing.

The county estimates were then weighted to calculate stratum totals, which were in turn summed to compute statewide totals and averages for county-level labor, overhead, and ODC costs. Additionally, the weights were used to calculate the total person years to complete implementation in the state of Ohio. The estimates of person-years of effort include income maintenance staff and other staff performing direct EBT implementation functions, but do not include time of overhead staff. Where contracted staff were used, the average cost per person-year of county staff (including overhead) was divided into the total contract cost to estimate the level of effort.

State Design, Development, and Implementation Costs

Sources of Data

The costs directly incurred by ODJFS for Direction Card system design, development, and implementation were estimated from interviews and cost documentation provided by the state.

State Interviews
The researchers conducted design and development phase interviews with ODJFS personnel in March 1997; these interviews focused on the state's role in system design, testing and planning for implementation. The researchers conducted implementation interviews with state personnel in April 1998 and July-October 1999. The key topics discussed include the main ODJFS activities associated with the following:

- Helping counties to prepare to implement off-line EBT;
- Providing ongoing support to counties during implementation;
- Resolving ongoing issues with retailers during implementation; and
- Working with the vendors during implementation.

Documents Reviewed
For the analysis of ODJFS implementation costs, ODJFS provided the following quarterly reports:

- SF269 Financial Status reports for the Food Stamp Program;
- Back-up Central Accounting System (CAS) reports; and
- Federal and Internal Report Unit: Summaries of Food Stamp Administrative Costs.

The following documents were also provided by ODJFS:

- A listing of EBT staff time allocation;

- A listing by task of the amount of time and costs spent by contract staff on implementation activities; and

- Public Assistance Monthly Statistics (PAMS) reports.

Analysis of State Implementation Costs

As with vendor costs, ODJFS cost data were analyzed to separate true implementation costs from system operations during the implementation phase. Travel during the implementation period was considered purely implementation-related. For state costs during the implementation phase that were not purely implementation-related or operational in nature, the split between implementation and operations was computed on a quarterly basis, with the operational share equal to the percentage of the caseload that was on EBT. Data processing costs for implementation (i.e., CRIS-E usage by CDJFS staff for setting up cases on the EBT System) were not included as ODJFS does not track these costs.

Appendix B
Glossary

ACO   Assistance Control Office, the county office unit responsible for EBT training and helping recipients with card balance problems.

AMA   Automated Management Account, system used in conjunction with ASAP for funds management and settlement between FNS and EBT processors.

ARU   Audio Response Unit, system providing automated balance information and other customer services via telephone.

ASAP   Automated Standard Application for Payments, Federal Reserve system used to process payments from FNS' account for FSP redemption to EBT processors' bank accounts.

Booz•Allen   Booz•Allen & Hamilton, a contractor providing support to FNS for the technical evaluation of the Direction Card system.

CACI   CACI International, Inc., subcontractor responsible for equipping and servicing retailers and county offices (owner of the former Century Technologies, Inc.).

card block   A card block effectively disables a lost or stolen Direction Card, preventing its use in any EBT transactions.

card reader   The smart card reader is contained in the EBT terminal. The card reader reads information from and writes transactions to the customer's benefit card.

CDJFS   County Department of Jobs and Family Services, the agency in each Ohio county that administers the food stamp and EBT programs under the supervision of ODJFS.

Citicorp EFS   Citicorp Electronic Financial Services, Inc., the prime contractor for the EBT program for the State of Ohio. Citicorp EFS is a wholly owned subsidiary of Citigroup.

CMS   Card Management System, including a personal computer (PC), smart card reader/writer with PIN pad, and printer, used to issue Direction Cards and perform all other card-related services provided at the CDJFS.

COPA   Category of Public Assistance, such as Food Stamps or TANF. A COPA designator is associated with each EBT transaction.

CRIS-E	Client Registration Information System-Enhanced, the computer system used by the ODJFS to determine client eligibility for the FSP and monthly allotment amounts.
CST	Customer Service Terminal, used in some CDJFS offices for on-line access to the EBT system host computer.
Direction Card	Registered service mark of ODJFS, which denotes the State of Ohio's EBT smart card system.
EBT	Electronic Benefits Transfer
FCO	Fiscal Control Office, the county office unit that handles EBT functions related to card issuance, card replacement, PIN change, unlocking EBT cards, issuance site selection for FSP benefits, and coupon conversion.
FNS	Food and Nutrition Service, agency within U.S. Department of Agriculture that administers the Food Stamp Program.
FSP	Food Stamp Program
HRC	Host Reference Counter, a data field used to track the number of value-changing transactions posted to the Direction Card.
Jigsaw	Model of DataCard smart card POS terminal used in the Direction Card system.
kbps	Kilobytes per second, a measure of the speed by which data are transmitted over a communications system.
MAC	Message Authentication Code, security code added to communications message. The value of the code is based on information contained in the message.
NPC	National City Processing Corporation, original parent company of Stored Value Systems (SVS) and prime contractor for the Montgomery County EBT pilot.
ODH	Ohio Department of Health, the state agency administering the WIC program in Ohio
ODJFS	Ohio Department of Jobs and Family Services
PAN	Primary Account Number, unique number assigned to the Direction Card.
PayEase	Name of the pilot, off-line EBT system implemented in Dayton, Ohio.
PayFlex	Name of smart card, manufactured by Schlumberger, Inc., used in Direction Card system.

PayWest	Name of the FSP/WIC off-line EBT system implemented in Wyoming.
PIN	Personal Identification Number
POS	Point of Sale
REDE	Retailer EBT Data Exchange, a computer system that enables FNS to communicate the authorization status of retailers to EBT vendors.
smart card	Plastic transaction card containing an integrated circuit chip capable of data storage, processing, or both.
SRAM	Static Random Access Memory.
staged issuance	Term used to describe the process of sending benefits to the EBT point of sale terminal at an issuance site.
SVS	Stored Value Systems, purchased in 2000 by Comdata Corporation, a subsidiary of Ceridian International Inc. Under a subcontract to Citicorp EFS, SVS processes EBT transactions and provides customer service for the State of Ohio's Direction Card system.
TANF	Temporary Assistance to Needy Families, federal/state cash assistance program, known in Ohio as Ohio Works.
WIC	Special Supplemental Nutrition Program for Women, Infants and Children